REPORT RESUMES

ED 003 305 24
OBJECTIVE MEASUREMENT IN INSTRUMENTAL MUSIC PERFORMANCE.
BY- GUTSCH, KENNETH U.
UNIVERSITY OF SOUTHERN MISSISSIPPI, HATTIESBURG
REPORT NUMBER CRP-1734 PUB DATE 64
EDRS PRICE MF-$0.27 HC-$5.80 145P.

DESCRIPTORS- *MUSIC EDUCATION, *APPLIED MUSIC, MUSIC, *TESTING, *ACHIEVEMENT TESTS, INSTRUCTIONAL MATERIALS, TEST CONSTRUCTION, STUDENT TESTING, HATTIESBURG, MISSISSIPPI

THIS STUDY DEVELOPED AN INDIVIDUAL TEST FOR ASSESSING A MUSIC INSTRUMENTALIST'S ACHIEVEMENT WHILE SIGHT-READING RHYTHMS. A MATHEMATICAL SYSTEM WAS USED TO CONSTRUCT 300 RHYTHMICAL PROBLEMS CONSISTING OF 1 OR MORE MEASURES OF MUSICAL NOTATION. BASED ON PRETESTING RESULTS, A TEST WAS CONSTRUCTED OF 200 FLASH CARDS ARRANGED IN ORDER OF DIFFICULTY. SPECIFIC STIPULATIONS WERE MADE REGARDING ADMINISTERING AND SCORING THE TEST. THE TEST WAS ADMINISTERED TO ALMOST 800 PUBLIC SCHOOL STUDENTS WHO WERE IN THE FIFTH GRADE OR ABOVE AND HAD COMPLETED AT LEAST 6 WEEKS OF INSTRUMENTAL MUSIC EXPERIENCE. IT WAS CONCLUDED THAT THE TEST HAD CONSTRUCT VALIDITY AND THE JUDGES WHO SCORED THE TEST WERE RELIABLE. THERE WAS A LEARNING EFFECT BETWEEN FIRST AND SECOND TEST ADMINISTRATIONS. (JM)

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

OBJECTIVE MEASUREMENT IN INSTRUMENTAL MUSIC PERFORMANCE

Cooperative Research Project No. 1734

Kenneth Urial Gutsch

University of Southern Mississippi
Hattiesburg, Mississippi

1964

The research reported herein was supported by the Cooperative Research Program of the Office of Education, U.S. Department of Health, Education, and Welfare.

ED 003305

ACKNOWLEDGMENTS

The author welcomes this opportunity to acknowledge his appreciation for the cooperation received from school administrators and music directors who helped make this study possible.

He wishes to express his sincere thanks to Francis Miller, Glynn Martin, Carlos Elmore, James Davis, and James Toomey for their help as graduate assistants and to Jorga Mae Pound, Judith Luke, and Dewey Miller for their help as student assistants.

He is especially indebted to his research technician, Joseph Berryman, whose diligence and cooperation brought continuity to this study and to his secretary, Nancy Ramey Gutsch, for her very capable handling of the many and varied responsibilities encountered during this study.

TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS ii

LIST OF TABLES v

Chapter

I. INTRODUCTION: STATEMENT OF PROBLEM 1

The Need for the Study
  The Importance of Rhythm to Music
  The Importance of Sight-Reading to Music
The Problem
The Objectives
A Review of Related Research and Literature
  Performance Testing in Music
Delimitations of the Study
Assumptions
Definition of Terms

II. PROCEDURE 14

Step I - Design
  Basic Theory Underlying Design
  Design Relative to Theory
  Methods for Modifying Rhythms
  Utilization of Theory
Step II - Implementation of the Study
  Sampling
  Initiating the Study
  Tape Recordings
  Statistical Implications

III. ANALYSIS OF DATA 30

An Analysis of the Population Sampled
Test Reliability
Scorer Reliability
Relation of Scores with Other Variables
Norms
Item Analysis
An Analysis of Flash Cards: Form A

Chapter Page

IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . . 44

Summary of Study
  Modus Operandi
    Step I
    Step II
Conclusions
Recommendations

APPENDICES

A. TABLES OF SAMPLING DISTRIBUTION, MATHEMATICAL RESULTANTS, FIRST ORDER OF THE TEST FORMS; TESTING DATA FORM; LETTERS TO ADMINISTRATORS AND MUSIC DIRECTORS; GENERAL INFORMATION DATA FORM; CONVERSION TABLE 57

B. MATRICES OF INTERCORRELATIONS FOR SUCH SELECTED VARIABLES AS I.Q., SCHOLASTIC AVERAGE, GRADE IN SCHOOL, INSTRUMENTAL MUSIC EXPERIENCE, AND AGE 80

C. SCORER RELIABILITY AS DETERMINED BY FOUR ACADEMICALLY TRAINED JUDGES 84

D. LEVELS OF SIGNIFICANT DIFFERENCES IN THE PERFORMANCE OF SUBJECTS RELATIVE TO EXPERIENCE; MEAN SCORES AND STANDARD DEVIATIONS BY EXPERIENCE LEVELS 86

E. A COMPARATIVE ANALYSIS OF NORM TABLES BY EXPERIENCE LEVEL 89

F. A COMPARATIVE ANALYSIS OF NORM TABLES BY AGE LEVEL 105

G. ITEM ANALYSIS SHOWING PER CENT (P) OF SUBJECTS PASSING ORIGINAL AND REORDERED FORMS OF TEST . 123

H. ANALYSIS OF FLASH CARDS BY TYPE OF ERROR MOST FREQUENTLY MADE: FORM A 127

I. TABULAR PRESENTATION OF PER CENT (P) OF SUBJECTS SCORING AT EACH EXPERIENCE LEVEL WITHIN A GIVEN RANGE OF FLASH CARDS AND RECOMMENDATIONS FOR SCORING 132

BIBLIOGRAPHY 134

LIST OF TABLES

Table — Page

1. Sampling by Area Illustrating Potential for Sampling and Reasons for Loss 58

2. Nineteen Mathematical Resultants Translated to Musical Notation 59

3. Original Order of the Test: Forms A and B . . . 61

4. Conversion Table: To Convert Original Form of Test Into 1st or 2nd Reorderings 78

5. Matrix of Intercorrelations for Selected Variables (Form A Administered First) 81

6. Matrix of Intercorrelations for Selected Variables (Form B Administered First) 82

7. Matrix of Intercorrelations for Selected Variables (When Forms are Combined) 83

8. Scorer Reliability: Correlations of Judges' Ratings with Those of Test Administrators on a Randomly Selected Sample of Tape Recorded Sessions 85

9. Mean Scores and Standard Deviations by Experience Levels: Based on Combined Forms for 771 Subjects 87

10. Levels of Significant Differences in the Performance of Subjects Relative to Experience . . . 88

11. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Six Weeks to One Year of Experience 90

12. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with One Year to Two Years of Experience 92

13. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Two Years to Three Years of Experience 94

14. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Three Years to Four Years of Experience 96

Table Page

15. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Four Years to Five Years of Experience 98

16. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Five Years to Six Years of Experience 100

17. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Six Years to Seven Years of Experience 102

18. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Seven Years to Eight Years of Experience 103

19. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students with Eight Years to Nine Years of Experience 104

20. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Nine to Ten Years of Age 106

21. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Ten to Eleven Years of Age 107

22. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Eleven to Twelve Years of Age 108

23. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Twelve to Thirteen Years of Age 109

24. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Thirteen to Fourteen Years of Age 111

25. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Fourteen to Fifteen Years of Age 113

26. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Fifteen to Sixteen Years of Age 115

27. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Sixteen to Seventeen Years of Age 118

Table | Page

28. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Seventeen to Eighteen Years of Age 120

29. A Comparison of Raw Scores and Percentile Ranks on Forms A and B for Students from Eighteen to Nineteen Years of Age 122

30. Item Analysis Data Showing Per Cent (P) of 771 Subjects Passing Each Flash Card on Form A of the Original Test Based on 120 Hours of Pretesting 124

31. Item Analysis Data Showing Per Cent (P) of 81 Subjects Passing Each Flash Card on Form A of the First Reordering of the Test Based on Results from 771 Subjects 125

32. Item Analysis Data Showing Per Cent (P) of 137 Subjects Passing Each Flash Card on Form A of the Second Reordering of the Test Based on Results from 81 Subjects 126

33. An Analysis of Flash Cards by Type Error Most Frequently Made: Form A 128

34. Tabular Presentation of Per Cent (P) of Subjects Scoring at Each Experience Level Within a Given Range of Flash Cards and Recommendations for Scoring 133

CHAPTER I

INTRODUCTION: STATEMENT OF PROBLEM

The Need for the Study

During the past years, instrumental music has enjoyed an established position in the elementary and secondary schools in our country. In more recent years, it appears that this position has become increasingly less secure. One explanation for such a trend might be reflected in our ever changing conditions in which curricular modifications continue to place greater emphasis upon the "academic" content of the curricula. An ever increasing emphasis in this direction has been a real challenge for such aesthetic aspects of the curricula as art and music, and it now appears that man has reached a level of thinking which compels him to move into this world of abstractions and to accept the challenges offered here.

Perhaps one approach to meeting such challenges in this highly speculative world is through the development of more objective techniques for evaluation. At least it now appears that if certain aspects of the music program such as instrumental music are to continue to serve the many needs of youth, such programs will have to be justified in terms of improved teaching procedures and valid content.

Thus, it seems that if recommendations for improvement are to be forthcoming, some effort must be focused upon research which will lead to new and improved methods of evaluation and eventuate in results that will serve as a premise upon which to build a stronger music program.

Some indication of the need for work in this area is reflected by Schoen in the following statement:

> Since the advent of the scientific movement in education some twenty years ago, there have been reported in educational journals 221 studies on arithmetic, 436 studies on reading, 415 on language, 126 on spelling, 62 on writing, and not one on school music. I have counted some 300 experimental studies on music made in the last ten years, which does not exhaust the number. Of these not one bears directly on school music, and not one of them is by a person engaged in school music.[1]

H. A. Murphy expresses an equally strong desire to have this area researched and introduces the following idea which is focused directly upon music and the music director:

> Terminal tests present one of the most difficult problems which the conscientious teacher must face and try to solve. Educators differ widely on the value and type of final estimate of the student's achievement. However, circumstances force the majority of teachers to make such an estimate, regardless of the pros and cons of educational theory.[2]

More recently, some indication of the need for research in this area has been implied by T. H. Madison:

> Our scientists tell us that in many fields we are scraping the bottom of our supply of knowledge and that

---

[1] Peter W. Dykema and Karl W. Gehrkens, The Teaching and Administration of High School Music (Copyright C, 1941, Summy-Birchard Co., Evanston, Ill.), p. 366. Used by permission.

[2] Howard A. Murphy, Teaching Musicianship (New York: Coleman-Ross Co., Inc., 1950), pp. 188-89.

> there is a crying need for more basic and applied research . . . This is in contrast to that type of effort and investigation directed strictly to immediate pragmatic uses . . . Music educators themselves may well be in need of this type of inquiry.[3]

F. N. Andrews seems to reinforce this feeling of need in the following statement:

> We must remember that if we demand and receive the rights and prerogatives that go with identification as an academic subject, we also must accept the responsibilities that then devolve upon us. One alone is staggering: the measurement of musical growth.[4]

The Importance of Rhythm to Music

Although these statements reflect a need for some emphasis to be given to the area of music testing, it is not yet apparent from these statements exactly what components of music might best reflect a person's ability to perform on a musical instrument. Perhaps a statement made some years ago by Mursell will assist in bringing this issue to more of a focal point:

> It is usually a fixed item in the instrumental teacher's credo that if only pupils had a good sense of rhythm, their development would be enormously easier. This is absolutely true, because an instrumental technique, from the motor side, consists quite largely in

---

[3] Thurber H. Madison, "An Adventure in Concepts," Music Educators Journal, Vol. 44 (January, 1958), p. 32. This is reprinted from the Music Educators Journal, official magazine of the Music Educators National Conference, with permission.

[4] Francis N. Andrews, "Issues and Problems in Music Education," Music Educators Journal, Vol. 49 (September-October, 1962), p. 40. This is reprinted from the Music Educators Journal, official magazine of the Music Educators National Conference, with permission.

> rhythmic action set up within the mechanical limitations imposed by the medium.[5]

If one is to take this statement as a reflection of a specific need of the past and a need which may well have been fulfilled in more recent years one has only to turn to W. D. Revelli's statement to clarify the point that a need still exists:

> Of all elements which contribute to the successful musical performance few are as vital and important as rhythm. While tone, intonation and technical facility are indispensible to the effective rendition of a musical composition, rhythm is its very life and only through its proper presentation can the composition be made to achieve its true musical meaning. Yet, in spite of its paramount importance, rhythm is the most deficient element in the performances of our school bands, and seldom does this phase of our teaching program receive proper emphasis or attention.[6]

The Importance of Sight-Reading to Music

From a careful review of the literature, it appears that another element, that of sight-reading ability, might also serve to be of importance to music while at the same time lending itself well to test design. One statement by K. W. Gehrkens which reflects the importance of reading music is as follows:

> And yet the pupil ought to learn to read or he will be a musical illiterate, not being able by himself to "get at" the actual sound of a vocal or instrumental composition, and missing many things in all music that are forever hidden from those who have

---

[5] J. L. Mursell and M. Glen, *The Psychology of School Music Teaching* (New York: Silver-Burdett and Co., 1931), p. 310.

[6] William D. Revelli, "What About Rhythm?" *Etude*, Vol. 73 (May, 1955), p. 56.

> not achieved the power of compelling the staff to divulge its secrets.[7]

P. W. Dykema and H. M. Cundiff in their own erudite way conclude this:

> The ability to read music at sight is granted by everyone to be a valuable accomplishment. That this ability opens up a world of enjoyment and produces a stimulating feeling of mastery is not doubted. It is the process of gaining this power, and the seeming necessity of the consequent neglect of other valuable phases of musical experience which have caused controversy among music teachers. We are coming to believe now that the problem of sight-reading can in itself be musical and interesting, thus strengthening instead of impairing the love of music. Consequently, sight-reading is a problem in itself, needing special treatment and requiring special application.[8]

In a recent statement by J. L. Mursell, it seems more apparent than ever that some attention must be given to the area of reading:

> Our knowledge of the process of music reading is incomparably less complete and exact than is our knowledge of the process of language reading. In the latter field there had been an immense amount of well controlled and fundamentally significant research, in the former hardly any.[9]

Perhaps the crux of this problem is more appropriately focused in the following statement by E. B. Gordon than in any other statement previously made:

---

[7] K. W. Gehrkens, Music in the Grade Schools (Copyright C, 1934, Summy-Birchard Co., Evanston, Ill.), p. 8. Used by permission.

[8] P. W. Dykema and H. M. Cundiff, New School Music Handbook (Copyright C, 1939, Summy-Birchard Co., Evanston, Ill.), p. 149. Used by permission.

[9] J. L. Mursell, Education for Musical Growth (Boston: Ginn and Co., 1948), p. 241.

> Has not the time arrived when music educators should make a major issue of this reading problem and attempt to arrive at an agreement as to the degree of reading skill it is desirable for high school students to have and by what method this skill best may be achieved.[10]

A close examination of this material gives some indication that it is the very lack of significant research in the area of music which appears, in itself, sufficient reason for giving serious consideration to the development of an instrumental performance test which might evaluate a person's ability to achieve while sight-reading rhythms.

The Problem

It might be said that relative to previous findings, there is some evidence which seems to indicate that a problem in instrumental music evaluation might well involve two basic steps:

1. To work toward the design of an evaluative tool which will measure a music instrumentalist's ability to achieve while sight-reading rhythms and
2. To apply this tool to a group of students of the same and varied age levels and with the same and varied experience levels.

The Objectives

The specific objectives of such an effort would be:

1. To determine if an objective measurement of instrumental music achievement can be obtained on sight-reading rhythms, and

---

[10] E. B. Gordon, "Why Johnny Can't Read," Music Edcators Journal, Vol. 44 (January, 1958), p. 36. This is reprinted from the Music Educators Journal, official magazine of the Music Educators National Conference, with permission.

2. To differentiate degrees of attainment in instrumental music achievement while sight-reading rhythms.

With these objectives firmly in mind, it was necessary to focus considerable attention upon previous studies which seemed to bear heavily upon the direction of such a project. Thus it was that great emphasis was placed upon a review of related research and literature.

A Review of Related Research and Literature

As early as 1928, Kwalwasser[11] reported that the tests available such as the Kwalwasser-Ruch,[12] Beach,[13] Gildersleeve,[14] and the Hutchinson and Pressey[15] were designed to measure musical knowledge rather than performance.

Since this time new tests such as the Diagnostic Tests of Achievement in Music,[16] the Providence Inventory

---

[11] Jacob Kwalwasser, "Tests and Measurements in Music," Psychological Monographs, Vol. 40, No. 1, 1930, pp. 33-37.

[12] J. Kwalwasser and G. M. Ruch, Kwalwasser-Ruch Test of Musical Accomplishment (Iowa City: State University of Iowa Extension Division, 1924).

[13] F. A. Beach, Beach Musical Accomplishment Test (Emporia, Kansas: Bureau of Educational Measurements and Standards, Kansas State Teachers College, 1930).

[14] G. Gildersleeve, Gildersleeve Music Achievement Test (New York: Bureau of Publications, Teachers College Columbia University, 1933).

[15] H. E. Hutchinson and L. W. Pressey, The Hutchinson Music Tests (Bloomington: Public School Publishing Co., 1924).

[16] M. L. Kotick and T. L. Torgerson, Diagnostic Tests of Achievement in Music (Monterey, Calif.: California Test Bureau, 1950).

Test in Music,[17] and the Knuth Achievement Tests in Music,[18] have been developed. Comments by such authorities in music as Wing,[19] Larson,[20] and Fay[21] regarding these tests indicate that the greatest single criticism of such tests is that they reflect a proficiency in the area of factual learning and do not necessarily test the person's ability to read music or to perform on an instrument while reading music.

Performance Testing in Music

Perhaps the only two tests of performance which were developed prior to 1928 were the Hillbrand Test[22] and the Mosher Test.[23] Both tests were vocal tests designed specifically to measure sight singing ability.[24] Since these first efforts in the area of vocal performance, some work has been done in the measurement of achievement in instrumental music performance. Hendrickson and Stratemeyer[25] reported on several studies made before 1950 indicating that these studies were, for the most part, restricted to the testing of keyboard instruments.

---

[17] R. Allen, W. Butterfield, and M. Tully, Providence Inventory Test in Music (New York: World Book Co., 1932), p. 1336.

[18] W. E. Knuth, Knuth Achievement Test in Music (Princeton, N. J.: Educational Test Service, 1936).

[19] O. K. Buros (ed.), The Fourth Mental Measurements Yearbook (New Jersey: The Gryphon Press, 1953), p. 341.

[20] O. K. Buros (ed.), The Nineteen Forty Mental Measurements Yearbook (New Jersey: The Gryphon Press, 1941), pp. 154-55.

[21] O. K. Buros (ed.), The Nineteen Thirty-Eight Mental Measurements Yearbook (Rutgers University Press, 1938), pp. 119-20.

[22] J. Kwalwasser, "Tests and Measurements in Music," Psychological Bulletin, Vol. 25 (May, 1928), pp. 299-300.

[23] Ibid.

[24] Ibid.

One performance test constructed prior to 1950 is the test designed by Lamp and Keys[26] which was used to determine aptitude for specific instruments. The test consists of five parts, each of which contains twenty quarter notes, and involves no change of rhythmic pattern. The authors refer to the test as an objective approach to placing students rapidly and effectively on instruments for which they appear to be best suited.

In still another study, Bean[27] analyzed errors by marking the exact note missed. The study was conducted with piano students and contained chords rather than the single melodic line so common to instrumentalists.

A later study by Wheelwright[28] was focused upon the construction of a test which required the performer to read music while performing on the piano; emphasis was placed on spacing the notes in relation to time values.

---

[25] W. S. Monroe (ed.), Encyclopedia of Educational Research (New York: Macmillan Co., 1950), p. 768.

[26] C. J. Lamp and N. Keys, "Can Aptitude for Specific Musical Instruments be Predicted?" Journal of Educational Psychology, Vol. 26, No. 8 (November, 1935), pp. 581-96.

[27] K. L. Bean, "An Experimental Approach to the Reading of Music," Psychological Monographs, Vol. 50, No. 6 (1938), pp. 1-80.

[28] L. F. Wheelwright, An Experimental Study of Perceptibility and Spacing of Musical Symbols (New York: Bureau of Publications, Columbia University, Teachers College, 1939), pp. 1-116.

One of the most recent developments in test design has been promulgated by Watkins.[29] Watkins developed a test which demonstrated that objective measurement is possible on instruments other than the piano and organ. For his study, he used cornet players and attempted to evaluate both sight-reading ability and technical skill. Test reliability was established through the equivalent forms technique. When correlating the two forms of the test, i.e., Forms A and B, the coefficient was .95. The results of the study were based on a sampling of 153 students who took Form A and 71 students, of the 153, who took Form B. From this data, growth curves were constructed for sight-reading ability and for practiced performance.

Delimitations of the Study[30]

In studies of this type, the size of the sample appears to be a factor of considerable concern, and it was with regard for this problem that emphasis was placed on the selection of an area which was large enough to provide a good sampling potential. The area designated for research was located within a 40 mile radius of Hattiesburg, Mississippi. This location seemed to lend itself well to a study of this nature, for it had at its core the University of Southern Mississippi and the many facilities of the university. In addition to the research facilities which were available, the area, when first surveyed, had a sampling potential of 1,146 instrumental music students. Following is a listing of the schools located in the area designated for research and of the music directors who were engaged by these schools prior to or immediately after the research project was initiated.

---

[29] J. G. Watkins, Objective Measurement of Instrumental Performance (New York: Bureau of Publications, Columbia University, Teachers College, 1942), pp. 1-88.

[30] See Appendix A, Table 1, p. 58.

Schools	Music Directors
Bassfield High School*	Berry Gray
Beaumont High School	Robert Phelps
Bunker Hill High School*	Morris Sweatt
Columbia High School	James Brewer
Forrest County Ag. High School	James Westbrook
Hattiesburg High School	Aubrey Sievers
Hawkins Jr. High School	Aubrey Sievers
Jones Jr. High School	James Franklin
Lumberton High School	Fred Hogue
McLain High School*	Robert Martin
Moselle High School*	Kenneth Foster
New Augusta High School	Robert Phelps
Petal High School	Reed Carter
Poplarville High School	Gail Gunter
Prentiss High School	Jackie Allen
Purvis High School	H. N. Waggoner
Richton High School	Joseph Berryman
Rowan High School	Jesse Cook
Runnelstown High School	Carol Allen
Sand Hill High School	Grace Berryman
Seminary High School*	Lamar Smith
Stone High School*	Jackie Davidson
Sumrall High School	W. S. Colston
Maddox Jr. High School	Joe Murray
R. H. Watkins High School	Bill Bufkin

After the study was introduced the schools marked by an asterisk (*) expressed an inability to become part of this project.

Assumptions

In an effort to focus the problem properly, it was assumed that

1. The nature of music today dictates a strong need for an individual instrumental music achievement test.
2. Music directors in the area designated for research are appropriately trained and qualified to examine students through the use of the instrument designed for this study.
3. This is one of many acceptable methods of approaching the problem of individual evaluation in instrumental music achievement.
4. Note values and time values used in this study closely parallel those introduced to students through method books and musical compositions used in the area designated for research.
5. The variable "time" can best be controlled in this study by scoring the test in terms of total response to the given rhythmical problem.

Definition of Terms

The following terms have been defined relative to their use in this study:

Rhythmical Problem.--As used in this study the term rhythmical problem refers to a resultant which has been transformed into musical notation. Each rhythmical problem in this study consists of one or more measures.

General Method of Graphs.--As used in this study, this term applies to the concept that . . . music can be graphed by allowing the lengths of a number of horizontal lines to stand for duration of tones.

Unit of Time.--A term which refers to any note value, i.e., sixteenth, eighth, quarter, half, or whole note, assigned to the smallest number in any given resultant.

Resultant.--The term resultant refers to the results obtained when two periodicities are synchronized to form a new rhythm.

Periodicity.--A term which refers to a continuous recurrence of a group of sound waves as they appear when graphed.

Synchronization.--This term refers to the act of combining two periodicities to form a new rhythm.

Time Value.--Time value refers to time signatures, i.e., 2/4, 3/4, 4/4, 5/4, 3/8, 5/8, 6/8, etc.

Displacement.--Displacement refers to the modification of the resultant through the alteration of numbers in the resultant in a clock-wise motion.

In an effort to assist the reader to gain a clear understanding of the implementation of this study, the modus operandi is presented in two steps. The first step, Step I, includes those activities initiated to develop an evaluative tool which will measure a music instrumentalist's ability to achieve while sight-reading rhythms. The second step, Step II, includes those activities necessary for the application of such a tool to students of the same and varied age levels and with the same and varied experience levels.

CHAPTER II

PROCEDURE

Step I - Design[31]

As mentioned before, the study seemed to lend itself well to a two step design, the first step of which involved the construction of an instrument for the purpose of assessing an individual's instrumental musical achievement while sight-reading rhythms. Thus, some basic theory which appeared both feasible and logical had to be incorporated as a frame of reference from which to obtain the desired results.

Basic Theory Underlying Design

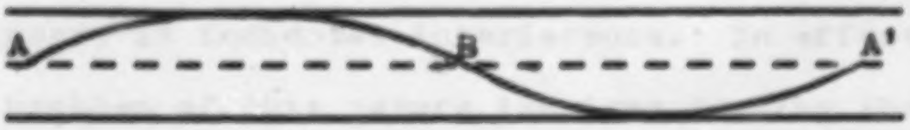
In the establishment of a frame of reference, it seemed essential to consider those approaches to test development which would be fresh in nature as well as objective in design. It was with such a goal in mind that Schillinger's system of rhythmical construction was recognized as a focal point from which to begin. The idea which was utilized for this study was his concept that meaningful sound which has been projected into motion, such as in music, can be produced through a logical and systematic method. This is to say that if music can be projected into a form of motion, then, forms of motion can be, through proper and systematic techniques, converted into music. One technique which lends itself well to such a theory is the general method of graphing. Through this method it became possible to convert linear configuration into motion and take advantage of a system of design which seemed to bring about a uniformity of structure, an ease of rhythmical modification, and an abundance of rhythmical variations.

---

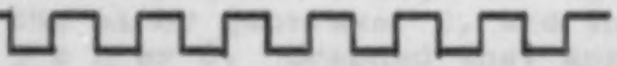
[31] The ideas presented under Step I of the Procedure are attributable, in part, to Joseph Schillinger and can be found in the following source: Joseph Schillinger, *The Schillinger System of Musical Composition* (Copyright 1941, 1942, 1946 by Carl Fischer, Inc., New York), Vol. I, pp. 1-20. Permission to use this material has been granted by Carl Fischer, Incorporated and by Mrs. Joseph Schillinger.

Design Relative to Theory

Since the use of the general method of graphs seemed appropriate to the study, it was a technique which was employed throughout the design of the instrument. Part of the technique involved reading a horizontal coordinate from left to right and a vertical coordinate from top to bottom in order to determine from the horizontal coordinate an expression of musical time and from the vertical coordinate an expression of the recurrences of a phase, i.e., the moment of attack. Another advantage to the use of the general method of graphs was the apparent objectivity which such a method seemed to offer. It was relative to this frame of reference that much emphasis was placed upon understanding the sound wave in its simplest motion and the conversion of such motion into a systematic pattern of rhythms through the use of graphs. In its simplest motion the sound wave had the following appearance and was referred to as one period or recurrence group:[32]



These distances, A and B, and B and A' are equal and are units of measurement which can be expressed musically as phases. In a continuous sequence of wave motion (~~~~) such equal units of measurement constitute a periodicity of phases. When these equal units are presented on a graph, the horizontal lines express time, and the vertical lines express the moment of attack, consequently producing a continuous sequence of phases which give the following graph-like appearance:[33]



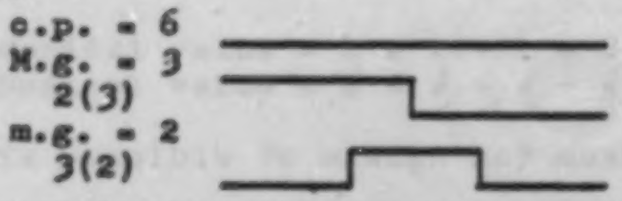
As used in this study, this continuous sequence is referred to as a periodicity of phases. When the sequence has no variation, as is evident in the above case, it is called a monomial periodicity. Two periodicities, each having different sized phases, may be combined to produce a new rhythm; this is referred to as synchronization. When two phases are expressed numerically and are combined or synchronized, the larger number is referred to as the major generator and the smaller number is referred to as the minor generator. The way of expressing the interference of these two generators is A:B or A÷B, with neither sign employed as it is in ordinary arithmetic. Thus, 3÷2 does not indicate the division of 3 by 2 but rather, in graphing, as suggested by Schillinger, it indicates interference. In effect, resolving a problem of this nature involves finding the common product of the two periodicities, 3 and 2, graphing the major and minor generators, and dropping perpendiculars from all points of attack on both generators. Figuratively speaking, the resultant is determined in the following way:[34]

---

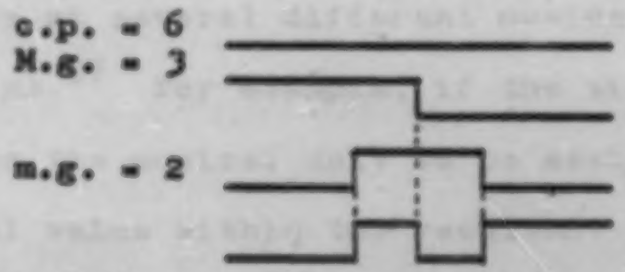
[32] Ibid., p. 2.

[33] Ibid., p. 3.

1. Find the product of two periodicities (for this example the numbers 3 and 2 will be used). The larger number (3) serves as the major generator while the smaller number (2) serves as the minor generator. By multiplying the two generators (3 x 2) it is possible to arrive at the product of these two periodicities which, in this case, is 6.
2. Graph the major and minor generators and the common product using the major generator 3, the minor generator 2, and the common product 3 x 2 or 6. Graphed they appear much like this:[35]



3. Drop perpendiculars from all points of attack on both generators:



Resultant 2 + 1 + 1 + 2

---

[34] Ibid., p. 4.

[35] Ibid., p. 7.

When two generators have been graphed and a resultant determined (as indicated in the preceding example where the resultant is 2 + 1 + 1 + 2) then it is possible to translate the numbers of the resultant into musical notation, i.e., a rhythmical problem, and place this rhythmical problem on a flash card for testing purposes. In order to make this translation from numerical value to musical notation, a musical unit of value must be assigned to the smallest number value in each resultant and each number value within this resultant must then be translated in terms of this unit. An example of this concept as used in this study would be to take the smallest number in the resultant 2 + 1 + 1 + 2 which would be the number "1" and to assign this number the musical unit of one quarter note (♩). When translated from numerical value to musical value, the translation would appear as follows:[36]

Numerical value = 2 + 1 + 1 + 2
Musical value = 𝅗𝅥 + ♩ + ♩ + 𝅗𝅥

Since it is possible to assign any musical unit to the smallest numerical value in each resultant, it is possible to arrive at several different musical problems from each resultant.[37] For example, if the eighth note (♪) were designated as the musical unit to be assigned to the smallest numerical value within the resultant 2 + 1 + 1 + 2, then the resultant, when translated to musical notation would = ♩ + ♪ + ♪ + ♩ .

---

[36] Ibid., p. 3.

[37] See Appendix A, Table 2, pp. 59-60.

Much of the flexibility in such an approach appears to be relative to the generators used to produce the resultants from which the musical rhythms are derived. Since it is necessary to preclude generators which give recurrences of previous cases (such as a generator 6:4 which would give the same resultant as 3:2), the study was restricted to the use of the following generators:[38]

3:2
4:3
5:2 5:3 5:4
6:5
7:2 7:3 7:4 7:5 7:6
8:3 8:5 8:7
9:2 9:4 9:5 9:7 9:8

Methods for Modifying Rhythms

Although it might appear to many observers that the generators themselves afford the potential for great variety in the production of rhythms, these rhythmical problems are more readily utilized when subjected to change through such methods as (1) changing units of time, (2) changing time values, (3) inserting rests for notes, and (4) changing problems through displacements.

Utilization of Theory

Applying the techniques introduced to this point, it was possible to arrive at nineteen basic mathematical problems of resultants[39] which eventuated in 300 rhythmical problems each one measure or more in length. After each resultant was changed into musical notation, rhythmical modifications were produced by (1) changing the musical unit assigned to the smallest numerical value in each resultant, (2) changing the time values or time signatures of each musical translation, (3) displacing notes systematically in each musical translation, and (4) inserting rests for notes. It was through this final step, the insertion of rests for notes, that equivalent but not identical forms became possible. After these modifications were made, each rhythmical problem was placed on an individual flash card with the focus of attention upon reproducing manuscript identical in size with that found in the method book recommended by the Mississippi State Department of Education for beginning instrumental music students.[40] Using a total of 300 flash cards or a total of 150 flash cards in each of two forms, Form A and Form B, two pretesting periods, each 60 hours in length, were conducted by academically trained musicians to determine what modifications, if any, had to be made with regard to the test and the administration of the test. Through pretesting methods and careful scrutiny by a committee of three academically trained musicians, it was found that 100 of the flash cards could be precluded on the basis of consistent rhythmical overlap. This is to say that the rhythms on these cards produced structural repetition or rhythmical problems which were completely reproduced on a series of other flash cards.

---

[38] Schillinger, op. cit., p. 10.

[39] See Appendix A, Table 2, pp. 59-60.

---

[40] See Appendix A, Table 3, pp. 61-65.

The remaining 200 flash cards, 100 flash cards in Form A and 100 flash cards in Form B, were arranged in an order of difficulty derived from pretesting results. With considerable attention given to the methods used to administer and score the test during the pretesting periods and with equal attention given to the fact that the test was to be administered to individual students, it seemed imperative to make the following stipulations with regard to test involved procedures:

A. Testing as a procedure

1. The student should be given five minutes to "warm-up" his instrument.
2. The student should be seated facing a music stand adjusted to a height suitable for clear vision.
3. Two sample flash cards should be presented to the student in an effort to acquaint him with the test.
4. The student should be given 5 seconds, as timed with a stop watch, to review each new flash card prior to performance.
5. Each test administrator should have as part of his equipment a pocket metronome.
6. The metronome speed should be adjusted to "88" as suggested by Watkins in an earlier study.[41]
7. The metronome should be started, and should continue throughout each problem in an effort to equate tempos.
8. Each flash card represents one rhythmical problem consisting of one or more measures. Scoring is done in terms of total response to the rhythmical problem. If the student passes the rhythmical problem, it should be scored by placing a check (✓) mark in the "P" column for pass. If a student fails the rhythmical problem, the precise area in which the mistake occurred should be marked in the "F" column for fail. All single notes or time values have been numbered on each flash card for each of the forms used by the

---

[41] Watkins, op. cit., p. 73.

test administrator. Student forms remain unnumbered to prevent distractions. All scoring is to be done on a special scoring sheet.[42]

B. Administration of the test as a procedure

1. Permit five minutes for "warm-up" period.
2. Seat the student.
3. Adjust the music stand.
4. Check the lighting.
5. Check the metronome.
6. When the student is comfortably seated and is ready to play, present a trial flash card. Explain to the student that the purpose of the flash card is to acquaint him with the problems which are very similar to those found on the test. Two trial flash cards will be available so that the student can become familiar with the testing situation.
7. Call the student's attention to each time signature.
8. Permit the student five seconds to review each new flash card.
9. Set the metronome at 88.
10. Score the flash cards in terms of response to the total problem.

C. Standards for scoring the test as a procedure

1. Time.--Any note which is not held for its proper value (time is set by the metronome) will be considered an error. Thus, a sustained tone of four beats cannot be considered properly played unless it is held for four beats. It must be remembered that the metronome sets the standard for differentiation between properly and improperly played.
2. Tie.--A tie shall not be considered correctly played if it is tongued, omitted, held too long, or held, but not long enough.
3. A Rest.--It shall be considered an error to sustain, ignore, or hold a rest for incorrect periods of time.

With these concepts clearly in mind, it was further stipulated that each test administrator would have one personal set plus two additional sets of the test, one for bass clef instruments and one for treble clef instruments; each set would consist of two copies of each form of the test, Form A which was to be administered first and Form B which was to be administered within approximately 48 hours after Form A. It was further pointed out that each set of the test would be identified for proper use. The precise area in which a mistake was made became of some consequence in this study, and it was necessary to number each note and time value on each of the personal test sets assigned to music directors so that results could be recorded with ease.[43]

---

[42] See Appendix A, Testing Data Form, pp. 66-69.

Thus it was that the instructions for the administration of Forms A and B were worked out in detail, placed on the testing data form for convenience, and utilized with each student tested.[44] After approximately half of the students within each individual music setting had been sampled, music directors who were administering the test were asked to reverse the procedure and to administer Form B first and Form A within approximately 48 hours. This gave researchers who were working with this data the opportunity to compare the form given first with the form given second.

---

[43] See Appendix A, Testing Data Form, pp. 66-69.

[44] Ibid.

Step II - Implementation of the Study

Sampling[45]

To attain the second objective of this study, the application of this instrument to a group of students having the same and varied age and experience levels, it was necessary to solicit the cooperation of music directors and school administrators in the area stipulated for research. In an effort to define this area for sampling purposes, the following criteria were established: It was considered essential that (1) musical groups used for sampling purposes be located in the Hattiesburg, Mississippi area or within a radius of approximately 40 miles from this area, (2) musical groups used be a part of the Mississippi Public School System, (3) students representing these musical groups consist of individuals who had reached the 5th grade level or above, (4) the sample consist of those students who were engaged in the instrumental music program, had at least six weeks of experience in instrumental music, and were present when the examination took place.

Initiating the Study

In an effort to elicit total cooperation from administrators and music directors, a letter was sent to each administrator on August 15, 1962, outlining briefly the nature of the study and requesting cooperation with the study.[46] On the 17th day of August, 1962, all public school instrumental music directors in the area designated for research were informed of the research project and were asked to cooperate with the study.[47] In a third letter sent out on August 20, 1962, school administrators as well as instrumental music directors were informed of a forthcoming visit by Raymond Mannoni, who was at that time serving as Associate Director of this research project and Chairman of the Division of Fine Arts at the University of Southern Mississippi.[48] During this visit the Associate Director and a student assistant used a previously devised data form to get information about students who appeared to be potential candidates for sampling.[49] This general student information was collected before the student was tested rather than at the time of testing because it was felt that most of the information sought was personal and would probably be more easily accessible from the administrator's office than from the music director's office.

---

[45] See Appendix A, Table 1, p. 58.

On the 6th of October, 1962, a letter of gratitude was sent to each administrator who had been visited by Raymond Mannoni.[50] Further efforts to obtain total cooperation were made through telephone calls and personal visits by the Director of the project and his Research Technician,

---

[46] See Appendix A, Letter #1, p. 70.

[47] See Appendix A, Letter #2, p. 71.

[48] See Appendix A, Letter #3, p. 72.

[49] See Appendix A, General Information Data Form, p.73.

[50] See Appendix A, Letter #4, p. 74.

Joseph Berryman. By the 24th of October, 1962, it was felt that adequate preparatory steps had been taken and that an orientation program could be held for all instrumental music directors who were in the research area and who felt that they might like to cooperate with the research study.[51] Thus it was that the first orientation program was held on November 3, 1962, and served to initiate formally the study within the area designated for research. In an effort to further assist instrumental music directors in their administration of the test, a second orientation program was held on December 1, 1962, and music directors engaged in the study were encouraged to introduce problems relative to their first testing experiences.[52]

Since some music directors were unable to attend the first two orientation programs while at the same time expressing an interest in the study, steps were initiated to provide orientation services within specific school settings whenever such services were requested.

Perhaps of greatest importance to the study was the fact that the orientation programs provided sufficient opportunity to acquaint each music director with a realistic concept of what the test was like and the problems which might normally appear when administering the two forms of the test. Basic to much of what was said and done at these meetings was the idea that a test having two forms, each of which consumed approximately one hour of testing time, could pose many and varied problems to school administrators who were assisting with test scheduling as well as to music directors who were engaged in administering the test. In an effort to combat these problems which later proved to be quite persistent, steps were taken to organize a testing team composed of academically trained musicians. The team approach was not initiated until the first week in March of 1963 when it was felt that music directors were falling far behind in their testing responsibilities.

---

[51] See Appendix A, Letter #5, p. 75.

[52] See Appendix A, Letter #6, p. 76.

Tape Recordings

During the orientation programs music directors were asked to provide lists of their respective instrumental music students so that a systematic pattern could be worked out which would permit test administrators to tape a sampling of the testing sessions. In effect, each music director was informed that an attempt to establish scorer reliability was to be made by tape recording and examining a random sampling of approximately 10 per cent of his total group.[53] He was further informed that when he taped, it was essential to record the student's name and the form of the test being administered. Since each form of the test consumed one hour of testing and since many of the schools were without recording equipment, it was essential to seek a method of recording which was convenient to everyone involved. With Joseph Berryman serving as coordinator of the testing program, tapes and tape recorders were transported from the University of Southern Mississippi to schools that lacked the necessary equipment for recording. Those music directors who purported to have such equipment were permitted to submit tapes at the end of their sampling period.

---

[53] See Appendix A, Letter #7, p. 77.

From January of 1963 until September of 1963 personal contact was maintained with each of the institutions participating in this study and every effort was made by the director of this study to assist with scheduling, orientation, or other problems which presented themselves. By September of 1963, the first steps were initiated relative to tabulating and processing the data at hand.

Statistical Implications

It appeared that there were several statistical implications which adapted well to this study and could be given considerable attention as the study transpired. First, it seemed that scorer reliability was essential to this study and could best be obtained by tape recording a random sampling of testing sessions and correlating Form A rated by Scorer I at time 1 with Form A rated by Scorer II at time 1. Second, it appeared that test reliability was necessary and could best be established by correlating Form A rated by Scorer I administered at time 1 with Form B rated by Scorer I administered at time 1. Third, it seemed that the best method for arriving at the validity of the test when there was no definitive criterion measure was through a construct method. Thus it was decided that if the items of the test differentiated between groups of students with varying degrees of instrumental music experience, then construct validity would be demonstrated. This was, of course, relative to the extent to which the results obtained were produced by the dimensions purportedly being measured and not by such other variables as Grade in School, I.Q., Scholastic Average, and Age. Fourth, it seemed essential to do an item analysis on the two forms of the test, to reorder the forms based on this analysis, and to apply the reordered forms to a portion of the total subjects previously tested one year before in an effort to determine what effect, if any, reordering the forms would have upon the reliability of the test.[34]

---

[34] See Appendix A, Table 4, pp. 78-79.

CHAPTER III

ANALYSIS OF DATA

The techniques and concepts employed in gathering data were introduced in Chapter II. Utilizing these techniques and concepts, it was possible to obtain complete test protocols for 771 subjects who had at least six weeks of training in the area of instrumental music, were at the 5th grade level or above in school, and were located within the area designated for research.

An Analysis of the Population Sampled

In an effort to determine the sampling potential in the area designated for research, a survey was conducted prior to and extending through the month of September, 1962. This was a period of time directly preceding the orientation programs and is referred to in this study as the preorientation period. The results of this survey revealed a sampling potential of 1,146 instrumental music students.

The period of time directly after the orientation programs were held and immediately preceding the implementation of the testing program is referred to in this study as the postorientation period. It was during the postorientation period that seven schools representing a sampling potential of 232 subjects, expressed an inability to participate in this study. As a direct result of this decision the actual sampling potential dropped from 1,146 subjects to 914 subjects before the testing program was initiated. Of the 232 subjects lost between the preorientation population of 1,146 subjects and the postorientation population of 914 subjects, 138 subjects were lost by virtue of the fact that some schools were without music directors or were within the process of changing music directors. The remaining 94 subjects were lost because music directors did not care to participate in this type of research or because the music directors made previous commitments which precluded their active participation. Of the total of 914 subjects available for testing in the area designated for research, 113 were lost as a result of scheduling difficulties and 30 were lost when data forms were misplaced, thus leaving a total of 771 subjects for whom complete test protocols were available. Although testing was not limited to any specific group, the sample was ultimately comprised of brass or woodwind instrumentalists.

In addition to complete test protocols for these 771 subjects, test administrators sought information on each student relative to age, instrumental music experience, grade level in school, scholastic average, and I.Q. as defined by standardized group tests. Using the total number of subjects for whom this information was available, it was found that the average subject participating in this study was a person 14 years and 10 months of age with 3 years and 9 months of instrumental music experience, was at the 9th grade level in school, had an over-all scholastic average of "B", an I.Q. of 108, and passed 62 flash cards on each form of the instrumental music test.

Test Reliability

As was previously indicated in the second chapter under Procedure, the two forms of the test, Form A and Form B, were constructed as equivalent forms to be administered within 48 hours of each other. To counterbalance any effects created by learning and/or fatigue, test administrators were instructed to alternate the forms of the test at various intervals. Utilizing this technique throughout the testing of the 771 subjects, 366 subjects took Form A of the test first while 405 subjects took Form B of the test first.

When Pearson product-moment correlations between scores on the two forms of the test were computed, they revealed a high consistency.[55] When Form A of the test was administered first, the correlation between the two forms was .968. When Form B of the test was administered first, the correlation between the two forms of the test was .964. Combining these two correlations by translating the coefficients to corresponding Z' values and weighting these values resulted in a correlation coefficient of .9659. Correlating the two forms of the test regardless of the order of presentation resulted in a coefficient of .924. All of these coefficients are significant beyond the .01 level of confidence.

---

[55] See Appendix B, Tables 5 through 7, pp. 81-83.

Scorer Reliability

Although this study involved a total of 25 public schools located in the area designated for research, there were only 23 music directors actually engaged in instrumental instruction at these institutions. Of these 23 music directors, seven did not participate for reasons already mentioned, i.e., previous commitments, lack of contractual agreement, anticipation of position change, or lack of interest. Of the 16 music directors remaining, three offered to do all of their own testing while 13 offered to do some testing and assist in working out schedules which made it possible to utilize the services of a testing team composed of four academically trained musicians from the University of Southern Mississippi.[56] The three music directors who did all of their own testing and the four members of the testing team accounted for the testing of 741 subjects or approximately 96 per cent of the total population sampled. In an effort to supply data for an estimate of scorer reliability, these seven test administrators randomly sampled and tape recorded, from within each of their unique testing groups, approximately 10 per cent of their subjects. A careful examination of these 72 tape recordings by a committee of four adjudicators revealed that the correlation between original scores and the scores of any single committee judge never fell below .99.[57]

---

[56] Supra (Testing team), p. 27.

Relation of Scores with Other Variables

A series of correlation coefficients was computed relating the test scores to variable factors which might influence, to some degree, the individual's performance on the test. The variable factors selected for this analysis were age, instrumental experience, grade level in school, scholastic average, and I.Q. as defined by standardized group tests. Correlations were compiled for each of the two forms of the test, i.e., separate conditions, and for both forms of the test, i.e., combined conditions. That is to say that each form of the test was correlated with each of the variable factors listed and then the two forms of the test were combined and the combined form was correlated with each of the variable factors. The resulting correlation matrices are presented in Appendix B, Tables 5 through 7 on pages 81 through 83. Many of these correlations were significant at or beyond the .05 level of confidence, yet added little to the accuracy of prediction of test score outcomes. A close examination of this material reveals that correlation coefficients of I.Q. with grade in school and those of I.Q.

---

[57] See Appendix C, Table 8, p. 83.

with age were never significant at the .05 level. When Form B of the test was given first the relationship between scholastic average and amount of instrumental experience was not significant at the .05 level of confidence.

Since age and experience were the two factors among those factors studied for which complete data were available and with which the project was most profoundly concerned, they were selected for further analysis. Correlation matrices indicated that experience as a variable factor was more highly related to success on test performance than any other single variable studied. To determine the relative influences of age and experience both partial and multiple correlations were computed. The partial correlations indicated that 16.03 per cent of the relationship between experience and test score was due to the influence of age, whereas 99.03 per cent of the relationship between age and test score was due to the influence of experience. Multiple correlations permitted an analysis of data through the use of Beta weights. The Beta weight for experience was .7054 while that for age was .0331, thus indicating that the major influence of age on score is the direct result of greater age allowing for more experience. It might be said that the variable factors of age and experience seemed of comparable importance to test performance until the analysis of data revealed that as age increased, experience also increased and that experience was the variable factor producing the greatest single influence upon performance.

The very nature of the sampling situation prevented the selection of subjects to fit certain prearranged age and experience combinations and therefore precluded the use of analysis of variance to determine the interaction of age and experience variables. The t-test was utilized in an effort to detect differences between mean scores of performance for given levels of experience as defined by years.[58] An analysis of data through the use of the t-test made possible the detection of differences between any two experience levels, regardless of age. From a careful examination of this material it was evident that each mean performance score increased with experience[59] and that each increase was significantly higher at or beyond the .05 level of confidence than any given mean score of experience which preceded it. The analysis of scores by age levels revealed that higher age levels did not always score better than lower age levels and that the scores for some of the older subjects were lower than the scores for subjects who performed at younger age levels.

Norms

The high correlations between the two forms of the test served as a basis for the decision to present experience norms without regard for the order in which the two forms of the test were administered.[60] Along with the norms on experience, it was also considered essential to supply percentile norms based on age levels.[61] In both cases, the norm tables were based on the performance of the total group of 771 subjects. Specific recommendations for the applications of such findings with regard to future testing will be made in the next chapter.

---

[58] See Appendix D, Table 9, p. 87.

[59] See Appendix D, Table 10, p. 88.

[60] See Appendix E, Tables 11 through 19, pp. 90-104.

Item Analysis

Although profound consideration was given to a statistically oriented item analysis after pretesting sessions had been held, it was found that sampling inadequacies at that time would not permit such an approach. Realizing the difficulties involved in sampling outside of the area designated for research, it was decided to arrange the first order of the cards on the basis of pretest findings and later to do a statistically oriented item analysis.[62]

After complete test protocols had been acquired for 771 subjects, the two forms of the test were carefully analysed to determine the per cent of subjects passing each flash card. The cards were then reordered on the basis of difficulty, with the term difficulty defined as the per cent of subjects passing each flash card.

Approximately one year after the testing period, the reordered forms of the test were applied to a sampling of 81 subjects originally tested. Although this sample constitutes a number slightly in excess of 10 per cent of the 771 subjects participating in this study, it shall be referred to, for the purposes of this study, as a 10 per cent stratified random sampling of the total subjects tested. An analysis of the test results from this stratified random sampling revealed a Pearson product-moment correlation of .911 between the two forms of the test when there was no regard for the order in which the forms were presented. This coefficient of .911 was found to be significant beyond the .01 level of confidence and deviated only slightly from the coefficient of .924 found for combined forms when 771 subjects were originally tested. A further study of sampled test scores and original test scores revealed that sampled scores were consistently higher than original test scores and that the difference reflected by such scores was significant at the .05 level of confidence.

---

[61] See Appendix F, Tables 20 through 29, pp. 106-22.

[62] See Appendix G, Tables 30 through 32, pp. 124-26.

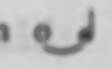
The results obtained from the stratified random sampling of 81 subjects seemed to indicate the need for some additional modifications of the test in order to refine the instrument sufficiently to make specific recommendations regarding the administration and scoring of the test. In an effort to determine the pertinence of such modifications, Form A of the test was reordered for a second time and administered to a select sample of 137 instrumental music students who had never before seen the test. When test results were completed, rank difference correlations were computed using the original form of the test and reordered forms of the test in an effort to determine the significance of each reordering on the refinement of the test.[63] Results indicated that (1) when a rank difference correlation was computed between the original order of the test based on 120 hours of pretesting and the reordered form of the test based on the responses from 771 subjects, there was a coefficient of .888, (2) when a rank difference correlation was computed between the reordered form of the test based on 771 subjects and the test responses from the stratified random sampling of 81 subjects, previously tested one year before, there was a coefficient of .951, and (3) when a rank difference correlation was computed between the second reordering of the test based on the stratified random sampling of 81 subjects and test responses to this reordered form based on responses from 137 subjects never before tested, there was a coefficient of .980.

An Analysis of Flash Cards: Form A

It is probably advisable to recapitualte for a moment and state that for the purposes of this study, each flash card contained one rhythmical problem consisting of one or more measures of individual rhythmical entities referred to as rhythmical patterns. An analysis of each of the rhythmical problems included in Form A of the test revealed what appeared to be a modal tendency for errors. The modal error for any given rhythmical problem was a specific rhythmical pattern within this problem which served as a focal point for the majority of errors recorded on that specific problem.

---

[63] See Appendix A, Table 4, pp. 78-79.

Grouping the rhythmical problems according to rhythmical patterns most frequently missed, it was possible to identify those precise rhythms which appeared to be giving the subjects the greatest amount of difficulty. A further study of these grouped rhythms indicated that as identical rhythmical patterns appeared among flash cards, there was, with few exceptions, a reduction in the number of subjects who missed or erred on these repeated patterns. In effect, it can be said that as subjects progressed along a continuum from the first flash card to the last flash card on Form A of the test, the number of subjects making an error when identical rhythmical patterns reappeared for a second or third time was reduced. At first appearance one might believe that the same subjects who missed a given rhythmical pattern the first time were repeating their mistakes when the identical rhythm reappeared a second or third time. A more profound investigation, however, revealed that this was not the case. An example of what actually occurred can be seen by studying Flash Cards 38, 53, and 68 in Area I.[64] These flash cards had as their modal error the pattern  . On Flash Card 38 this rhythmical pattern was missed 104 times, on Flash Card 53 it was missed 80 times, and on Flash Card 60 it was missed 66 times.[65] When subjects who missed this particular rhythmical pattern were compared, it was found that 32.6 per cent of the 104 subjects who missed Flash Card 38 also missed Flash Card 53 and that 23.0 per cent of those subjects who missed Flash Card 38 also missed Flash Card 60. When Flash Cards 53 and 60 were compared, it was found that 40.0 per cent of those subjects missing Flash Card 53 also missed Flash Card 60.

A second example for consideration is the whole rest modal error in 3/4 time found on Flash Cards 30, 31, and 32 in Area II.[66] A study of the data indicates that of the 49 subjects who missed Flash Card 30, 40.8 per cent missed Flash Card 31 and 34.6 per cent missed Flash Card 32. When Flash Cards 31 and 32 were compared it was found that 41.4 per cent of those who missed Flash Card 31 also missed 32. This second example is rather unusual in that the error did occur a fourth time on Flash Card 34. The fourth appearance indicated an increase in the number of individuals making the error. This increase can probably be accounted for in terms of rhythmical patterns immediately preceding the modal error since the greatest difference between Flash Card 34 and any of the others in this group, i.e., Flash Cards 30, 31, and 32, seemed to focus on this area.

---

[64] See Appendix H, Table 33, pp. 128-31.

[65] Ibid.

[66] Ibid.

A further study of Table 33 will reveal that there are three other areas, i.e., Areas III, IV, and V, in which similar patterns were reflected. In each of these areas, the modal error unique to that area was missed at least three times. Each time the first appearance of a rhythmical pattern was compared with the second or third appearance there was a reduction in the number of subjects missing the rhythm. When comparing the second appearance of a rhythmical pattern with the third appearance, i.e., Area I, Flash Cards 53 and 68, there was always an increase in the per cent of subjects repeating the error. Serious consideration of this point seemed to indicate that when the number of subjects repeating an error remains constant or is increased, then the reduction in the total number of subjects missing the rhythmical pattern is inversely related to the per cent of overlap from one rhythmical problem to the next, thus giving the rhythmical problem the appearance of greater difficulty than actually exists. Modal errors which were unique to specific rhythmical problems and appeared only twice were presented for comparative purposes and are not listed by major areas. Other problems which did not lend themselves well to comparisons of this nature are explained in Table 33 in terms of their own unusual characteristics.

Of the 771 subjects who took the instrumental music test, complete information was available for the variables grade level, instrumental music experience, and age. I.Q.

scores were available for only 241 of the 366 subjects who performed on Form A of the test first and 287 of the 405 subjects who performed on Form B of the test first. Scholastic average was available for only 268 of the 366 subjects who performed on Form A of the test first and 298 of the 405 subjects who performed on Form B of the test first.

Since complete information for each subject relative to the variables I.Q. and scholastic average was not available, a further comparison of rhythmical problems based on these variables was not possible.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Study

This study was concerned with the development of an individual test for assessing one aspect of instrumental music performance. More specifically, the study sought evidence bearing directly upon two major points: (1) to determine if an objective measurement of instrumental music performance could be achieved on sight-reading rhythms, and (2) to differentiate degrees of attainment in instrumental music achievement through the sight-reading of rhythms.

Modus Operandi

The procedure adopted to accomplish these objectives seemed to lend itself well to a two step plan of operation in which Step I involved the development of an instrument for the purpose of assessing individual instrumental music achievement when sight-reading rhythms, while Step II involved the application of this instrument to a group of students having the same and varied age and experience levels.

Step I.--In order to attain the first objective, it seemed essential to utilize some basic theory which appeared both feasible and logical as a frame of reference from which to work. . .an approach which would be fresh in nature and objective in design. It was with such a goal in mind that Schillinger's system of rhythmical construction was considered as a frame of reference from which to begin. The idea utilized for this study was his concept that meaningful sound which has been projected into motion, as it is in music, can be produced through a logical and systematic method such as the general method of graphing. It was through the use of this method that linear configuration was converted into motion, thus introducing a system of test development which, when applied to music, brought forth a uniformity of structure, an ease of rhythmical modification, and an abundance of rhythmical variations.

Applying the techniques introduced by Schillinger, it was possible to arrive at 19 basic mathematical combinations which, when translated into musical notation, resulted in 300 rhythmical problems, each consisting of one or more measures in length. These 300 rhythmical problems were carefully screened by a committee composed of academically trained musicians who found sufficient evidence of structural repetition to preclude 100 of the rhythmical problems from the study. Since the design of the instrument seemed to lend itself well to the construction of equivalent forms, the 200 rhythmical problems which remained were systematically transformed into two forms of the test, i.e., Forms A and B. Each form consisted of 100 flash cards with each flash card representative of one rhythmical problem. The flash cards were then arranged in the sequential order of difficulty suggested by pretesting results. The results derived from pretesting also served as a guideline for the development of standards for administering and scoring the test.

Step II.--In order to attain the second objective of the study, namely, the application of this instrument to a group of students having the same and varied age and experience levels, it was necessary to solicit the cooperation of music directors and school administrators in the specific area designated for research. In defining the research area, the following criteria were established for purposes of sampling: It was considered essential that (1) musical groups used for sampling purposes be located in the Hattiesburg, Mississippi, area, or within a radius of approximately 40 miles from this area, (2) musical groups used be part of the Mississippi Public School System, (3) musical groups used consist of individuals who have reached the 5th grade level or above, and (4) individuals comprising the sample have at least six weeks of instrumental experience and present themselves for the examination when it was administered.

In an effort to elicit complete cooperation from school administrators and music directors, numerous letters, visitations, and telephone calls were utilized. With some interest reflected by these staff members, the University of Southern Mississippi provided facilities for workshops and orientation programs which were organized to acquaint project participants with the many and varied problems involved in this study. One problem which seemed to persist in spite of orientation activities was that of scheduling students for purposes of extensive testing. To combat such difficulties, a testing team was formed to serve whenever and wherever necessary.

Conclusions

An analysis of the data brought forth through the adaptation of these techniques and concepts introduced a variety of conclusions which have been organized to parallel the original presentation of this data in Chapter III.

Conclusion #1 - Sampling Loss.--The loss of students in the area designated for research remained a point of concern throughout the many months during which the study was conducted, and much attention was focused on enacting a method which might determine the significance of such a loss to the total project. A careful examination of the responses from the 771 subjects who participated in this research project indicated that these subjects were distributed over a continuum consisting of nine levels of experience. It appears that if the sample loss were distributed in the same proportion to the sample acquired, st[illegible]ost would have to perform at a level consistently high[illegible] lower to significantly affect the mean scores established by subjects tested. Some evidence that such a performance would not be apropos to the lost sample is reflected in an examination of past sight-reading performances at district and state music contests. It seems apparent from these records that those groups comprising the lost sample did as well as those groups who participated in the study.

A careful examination of variable factors which could affect the performance of the lost sample revealed that 86 per cent of those music directors who did not participate in the study and 87 per cent of those who did participate in the study received at least part of their training at the University of Southern Mississippi. Further study of the two groups indicated that 22 of the 23 music directors situated in the area designated for research had four year music degrees from accredited institutions of higher education, and that all of the instrumental music directors in the area designated for research used as their introductory method to instrumental music the Belwin Elementary Band Book. From such observation, it is now concluded that those subjects who participated in the study and those who did not participate were closely balanced in such aspects of performance as those measured in this study.

Conclusion #2 - Test Reliability.--The high consistency reflected when two forms of the test were correlated regardless of the order in which the forms were presented, i.e., .924, seems to indicate a degree of reliability. From these findings, it is concluded that the test is reliable.

Conclusion #3 - Scorer Reliability.--It is concluded from the correlation coefficient of .99 found between any single judge's score and any given score by a specific test administrator that the test has scorer reliability.

Conclusion #4 - Influence of Other Variables.--From the data available, i.e., age, instrumental music experience, grade level in school, scholastic average, and I.Q., it appears that experience was most influential on performance. From partial correlations which indicated that 99.03 per cent of the relationship between age and test score was due to the influence of experience and that 16.03 per cent of the relationship between experience and test score was due to the influence of age, it is concluded that of those factors studied experience had the greatest single influence on test score. It was further concluded from t-test results that it was possible to differentiate degrees of attainment in instrumental music while sight-reading rhythms.

Conclusion #5 - Item Analysis.--From the data available through item analysis, it appears that the necessity to continue to refine the test resulted from performance ties which were improperly reordered. It is thus concluded that such modifications as were suggested by the samplings can be incorporated in the final reordered forms of the test.

Conclusion #6 - Internal Analysis of Flash Cards.--In a previous discussion of Flash Cards 30, 31, 32, and 34, it was noted that these cards were among several groups of cards having a common modal error. Taking this group of cards as an example of a prevailing incident among these groups, it should be observed that the modal error in this specific case has been identified as a whole rest. Although the whole rest appeared 33 times in Form A of the test, it was missed most frequently when it appeared in 3/4 time and was preceded by a dotted half note, i.e., 49 subjects missed this rhythmical pattern on Flash Card 30, 41 missed on Flash Card 31, 32 missed on Flash Card 32, and 40 missed on Flash Card 34. The increase in the number of misses on Flash Card 34 probably results from the uniqueness of the rhythmical pattern following the whole rest. In each of the rhythmical problems presented on Flash Cards 30, 31, and 32, the whole rest was followed by a half note or a quarter note. Since it is apparent that the whole rest appears throughout Form A of the test and is missed only at certain times, it appears that (a) the exact note or rest on which the mistake occurs is not necessarily the precise rhythm which is giving the student difficulty, (b) the rhythmical patterns immediately preceding and immediately following the exact area in which the error occurred probably influenced the subject's performance at the given point of error, and (c) the rhythmical symbol as it appears on the flash card must remain in agreement with the subject's previous musical orientation. It is concluded that any specific error on any given rhythmical problem to which an individual is exposed must be considered in toto rather than as an isolated entity.

Conclusion #7 - The Test as a Learning Experience.--The lack of repetition of a modal error by subjects who previously missed a specific rhythmical pattern seems to imply that an exposure to the rhythmical problems presented in Forms A and B does serve as a learning experience and that as identical rhythmical patterns are presented in similar or identical ways there is a decline in the number of subjects repeating these errors. Further evidence that the test might serve as a learning experience can be seen by comparing performances on Forms A and B. Those subjects who were exposed to Form A of the test first performed consistently better on Form B. Those subjects who were exposed to Form B of the test first performed consistently better on Form A. From this evidence, it is concluded that an exposure to these rhythmical problems serves as a learning experience.

Conclusion #8 - Construct Validity.--It has long been the contention of statisticians that when an attempt is made to establish construct validity, the test that presumes to measure a trait or quality does so through the formulation of a network of theory which eventuates in definite predictions. Further, it is maintained that insofar as these predictions are borne out, the measure of the construct

2

is supported. This study has attempted to define the phenomenon being measured, it has attempted to measure this phenomenon in a frame of reference which approximated the actual behavior for which a measure was desired, it has attempted to appraise in proper proportion and perspective all of the significant dimensions of the phenomenon being measured, and it has attempted to determine to what extent the results produced were produced by the dimensions purportedly being measured.

Since the phenomenon, i.e., instrumental music achievement while sight-reading rhythms, was clearly defined, since the frame of reference in which the subject performed was identical with that in which the subject normally performs, since the test results indicated that the instrument developed has the ability to distinguish between any two levels of experience, and since the effect of such variable factors which might ordinarily be considered significant, i.e., age, grade level in school, scholastic average, and I.Q., were carefully studied with regard to the phenomenon being measured, it is concluded that within the confines of this study the test has reflected construct validity.

Recommendations

Utilizing the data secured through the efforts of this study, it appears that the following recommendations might be made:

Recommendation #1 - Further Research.--One study which might be pursued by researchers is an attempt at the development of mathematical constructs which could assist in producing systematic pitch variations and thus provide a means for testing psychomotor response. Further, it is possible that both the results from this study and the results from such a suggested study could be combined to test a broader area of instrumental music achievement.

A second research project which might be worthy of consideration is that of seeking to develop some understanding of aspiration level in music learning. Such a project might involve testing a group of students with the instrument developed in this study, selecting the upper and lower 10 per cent of the test score continuum, and exposing subjects who performed at these ends of the continuum to personality and other tests in an effort to determine, if possible, what forces prompted certain individuals to aspire to higher levels of achievement.

A third study which might be of some interest would involve testing students with the instrument developed in this project and attempting, through properly controlled conditions, to determine what influence such factors as the academic background, the previous music experience, and the present performance ability of the music director will have on his student's ability to perform while sight-reading rhythms.

Recommendation #2 - Teaching Techniques.--Since there is considerable evidence that learning does take place as a result of an exposure to the instrument developed in this study, it appears that the test could be used in the following ways: (a) It might be used to assist instrumental music students to develop a better concept of rhythms, (b) It might assist music directors to better evaluate what method books are most advantageous for students who need further work in the sight-reading of rhythms, and (c) It might be used to assist music directors to understand their own deficiencies in the area of sight-reading rhythms.

Recommendation #3 - Analysis of Remedial Work.--The instrument developed in this study can be used to locate and isolate general problematic areas. It might therefore be used to indicate to music directors the influence of specific rhythmical patterns on total performance.

Recommendation #4 - Design for New Materials.--It appears that the test has given some indication of how rhythmical patterns might be introduced in a logical sequence of difficulty. Perhaps some of the present day authors of instrumental music method books will utilize this information when designing new instrumental method books.

Recommendation #5 - Administration and Scoring.--With regard to the administration and scoring of the test, the following recommendations appear to be in order:

(a) It is recommended that item "4" under Section A, Testing as a Procedure, be changed. At present, it stipulates that the subject should be given 5 seconds, as timed with a stop watch, to review each new flash card. Extensive experience and data relative to this point indicate that to handle both a stop watch and a pocket metronome while attempting to score the test can become a problem. It is now suggested that the pocket metronome be used for timing the subject's exposure to each flash card and that 8 beats of the metronome (metronome speed: 88) be used in lieu of 5 seconds as timed by a stop watch.

(b) It is recommended that the Testing Data Form remain unchanged and that music directors utilizing this form continue to mark specific rhythmical patterns which are missed so that a more comprehensive understanding of specific relationships of performance errors is possible in terms of total rhythmical problems.

(c) It is recommended that music directors who use this test give priority to the second reordered form of the test. The conversion to this form is possible through Table 4, pages 78-79.

(d) It is recommended that Table 34, Appendix I, page 133 serve as a guide for scoring subjects who perform at a given experience level and within the range of flash cards suggested for scoring.

(e) It is recommended that music directors who use this test start at the bottom of the range for the specific experience level being tested. The flash card which is recommended as a starting point for each experience level can be observed in Appendix I, Table 34, page 133. From this information it can be seen that a subject with from three to four years of experience would start with Flash Card 20. If he is successful with this rhythmical problem he would be permitted to continue until he reaches Flash Card 100 or until he makes six consecutive misses. If the six consecutive misses come before the subject reaches Flash Card 100, it is recommended that this be considered his ceiling. Extensive data relative to this point indicate that the subject, under normal testing circumstances, will pass no more than one flash card after he has reached this ceiling. If he is unsuccessful in his first attempt at playing the first flash card commensurate with his experiential starting point, it is suggested that he be permitted to continue through the flash cards until he reaches his ceiling and then asked to return to the card directly preceding his starting point. From here he can continue on down to Flash Card 1 or until he has successfully completed one of the flash cards in this group. Such steps should do much to expedite testing procedures.

APPENDIX A

TABLES OF SAMPLING DISTRIBUTION, MATHEMATICAL RESULTANTS, FIRST ORDER OF THE TEST FORMS; TESTING DATA FORM; LETTERS TO ADMINISTRATORS AND MUSIC DIRECTORS; GENERAL INFORMATION DATA FORM; CONVERSION TABLE

TABLE 1

SAMPLING BY AREA ILLUSTRATING POTENTIAL FOR SAMPLING AND REASONS FOR LOSS

Area	Sampling Potential		Reasons for Sampling Loss			
	Pre Orientation	Post Orientation	Inability to Participate	Scheduling Problems	Loss of Data Forms	Sample Obtained
Bassfield	31	0	31	0	0	0
Beaumont	20	20	0	5	0	15
Brooklyn	45	45	0	3	0	42
Bunker Hill	27	0	27	0	0	0
Columbia	60	60	0	2	0	58
Hattiesburg	252	252	0	9	11	232
Laurel	168	168	0	43	0	125
Lumberton	35	35	0	8	12	15
McLain	26	0	26	0	0	0
Moselle	20	0	20	0	0	0
Petal	60	60	0	15	0	45
Poplarville	29	29	0	0	5	24
Prentiss	58	58	0	5	2	51
Purvis	28	28	0	12	0	16
Richton	85	85	0	4	0	81
Runnelstown	39	39	0	0	0	39
Sand Hill	35	35	0	7	0	28
Seminary	34	0	34	0	0	0
Sumrall	32	0	32	0	0	0
Wiggins	62	0	62	0	0	0
Totals	1146	914	232	113	30	771

TABLE 2

NINETEEN MATHEMATICAL RESULTANTS TRANSLATED TO MUSICAL NOTATION

Resultants	Unit	Time	Translation to Musical Notation
1. 2+1+1+2	𝅗𝅥 ♩ ♪ 𝅘𝅥𝅯	4/4 2/4 3/4 3/8	𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝅗𝅥 ♩ ♩ 𝅗𝅥 ♩ ♫ ♩ ♪ ♬ ♪
2. 3+1+2+2+1+3	♩ ♪	3/4 2/4	𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥 ♩ 𝅗𝅥. ♩. ♪ ♩ ♩ ♪ ♩.
3. 2+2+1+1+2+2	𝅗𝅥 ♩	C 2/4	𝅝 𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝅝 𝅗𝅥 𝅗𝅥 ♩ ♩ 𝅗𝅥 𝅗𝅥
4. 3+2+1+3+1+2+3	♩ ♪	3/4 3/8	𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥. ♩. ♩ ♪ ♩. ♪ ♩ ♩.
5. 4+1+3+2+2+3+1+4	♩ ♪	4/4 2/4	𝅝 ♩ 𝅗𝅥. 𝅗𝅥 𝅗𝅥 𝅗𝅥. ♩ 𝅝 𝅗𝅥 ♪ ♩. ♩ ♩ ♩. ♪ 𝅗𝅥
6. 3+3+1+2+3+2+1+3+3	♩ ♪	3/4 6/8	𝅗𝅥. 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. 𝅗𝅥. ♩. ♩. ♪ ♩ ♩. ♩ ♪ ♩. ♩.
7. 2+2+2+2+1+1+2+2+2+2	𝅗𝅥 ♩ ♪	3/2 3/4 3/8	𝅗𝅥 𝅗𝅥 𝅗𝅥 𝅗𝅥 ♩ ♩ 𝅗𝅥 𝅗𝅥 𝅗𝅥 𝅗𝅥 ♩ ♩ ♩ ♩ ♫ ♩ ♩ ♩ ♩ ♪ ♪ ♪ ♪ ♬ ♪ ♪ ♪ ♪
8. 2+2+2+1+1+2+2+2	♩	2/4	𝅗𝅥 𝅗𝅥 𝅗𝅥 ♩ ♩ 𝅗𝅥 𝅗𝅥 𝅗𝅥
9. 3+3+2+1+3+3+1+2+3+3	♩ ♪	3/4 6/8	𝅗𝅥. 𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥. ♩. ♩. ♩ ♪ ♩. ♩. ♪ ♩ ♩. ♩.

TABLE 2--Continued

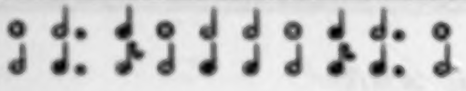
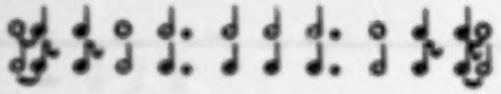
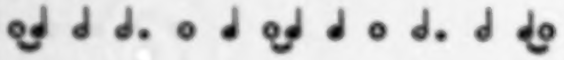
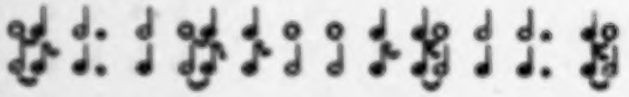
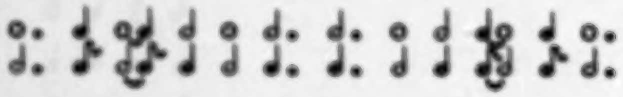
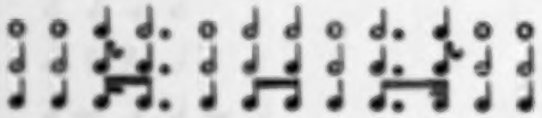
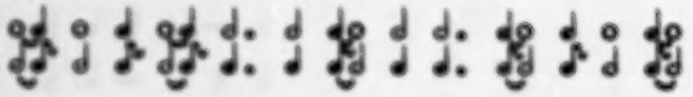
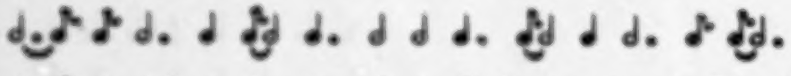
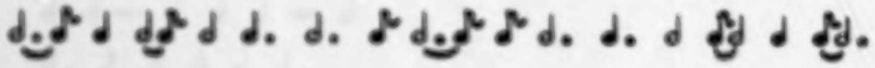
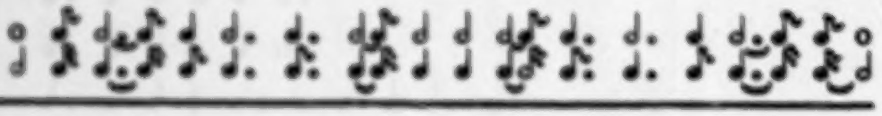
Resultants	Unit	Time	Translation to Musical Notation
10. 4+3+1+4+2+2+4+1+3+4	♩ ♪	4/4 2/4	
11. 5+1+4+3+2+2+3+4+1+5	♩ ♪	5/4 5/8	
12. 5+2+3+4+1+5+1+4+3+2+5	♩	5/4	
13. 5+3+2+5+1+4+4+1+5+2+3+5	♩ ♪	5/4 5/8	
14. 6+1+5+2+4+3+3+4+2+5+1+6	♩ ♪	6/4 6/8	
15. 4+4+1+3+4+2+2+4+3+1+4+4	♩ ♪ ♪	4/4 2/4 3/4	
16. 5+4+1+5+3+2+5+2+3+5+1+4+5	♩ ♪	5/4 5/8	
17. 7+1+6+2+5+3+4+4+3+5+2+6+1+7	♪	4/4	
18. 7+2+5+4+3+6+1+7+1+6+3+4+5+2+7	♪	9/8	
19. 8+1+7+2+6+3+5+4+4+5+3+6+2+7+1+8	♪ ♪	4/4 2/4	

TABLE 3

ORIGINAL ORDER OF THE TEST: FORMS A AND B

Flash Card No.	Form A	Time	Form B
1	𝅝 𝅗𝅥 𝅗𝅥 𝅝	4/4	𝄻 𝅗𝅥 𝅗𝅥 𝅝
2	𝅝 𝄼 𝅗𝅥 𝅝	4/4	𝅝 𝅗𝅥 𝄼 𝅝
3	𝅝 𝄻 𝅗𝅥 𝅗𝅥	4/4	𝅝 𝅝 𝅗𝅥 𝅗𝅥
4	𝄻 ♩ ♩ 𝅗𝅥	2/4	𝅗𝅥 ♩ ♩ 𝅗𝅥
5	𝅗𝅥 𝄽 ♩ 𝅗𝅥	2/4	𝅗𝅥 ♩ 𝄽 𝅗𝅥
6	𝅗𝅥 𝅗𝅥 ♩ ♩	2/4	𝅗𝅥 𝄻 ♩ ♩
7	𝅗𝅥 𝄽 ♩ 𝅗𝅥	3/4	𝅗𝅥 ♩ ♩ 𝅗𝅥
8	𝅗𝅥 ♩ 𝄽 𝅗𝅥	3/4	𝅗𝅥 𝄽 𝄽 𝅗𝅥
9	𝅗𝅥 𝅗𝅥 ♩ ♩ 𝅗𝅥 𝅗𝅥	2/4	𝅗𝅥 𝄻 ♩ ♩ 𝄻 𝅗𝅥
10	𝅗𝅥 𝄻 ♩ 𝄽 𝅗𝅥 𝅗𝅥	2/4	𝅗𝅥 𝅗𝅥 𝄽 ♩ 𝄻 𝅗𝅥
11	𝅗𝅥 𝄻 𝅗𝅥 ♩ 𝄽 𝅗𝅥	2/4	𝅗𝅥 𝅗𝅥 𝄻 ♩ 𝄽 𝅗𝅥
12	𝅗𝅥 𝅗𝅥 𝅗𝅥 ♩ ♩ 𝅗𝅥 𝅗𝅥 𝅗𝅥	2/4	𝅗𝅥 𝅗𝅥 𝅗𝅥 𝄽 ♩ 𝄻 𝅗𝅥 𝅗𝅥
13	𝅗𝅥 𝄻 𝅗𝅥 ♩ 𝄽 𝅗𝅥 𝄻 𝅗𝅥	2/4	𝅗𝅥 𝅗𝅥 𝄻 ♩ ♩ 𝅗𝅥 𝄻 𝅗𝅥
14	𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥 ♩ 𝅗𝅥.	C	𝅗𝅥. 𝄽 𝅗𝅥 𝅗𝅥 ♩ 𝅗𝅥.
15	𝅗𝅥. ♩ 𝄼 𝅗𝅥 ♩ 𝅗𝅥.	C	𝅗𝅥. ♩ 𝅗𝅥 𝄼 ♩ 𝅗𝅥.
16	𝅗𝅥. 𝅗𝅥. 𝄼 ♩ 𝅗𝅥. 𝅗𝅥. 𝄽 𝅗𝅥 𝄻 𝅗𝅥.	3/4	𝅗𝅥. 𝄻 𝅗𝅥 𝄽 𝅗𝅥. 𝄻 ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥.
17	𝅝 ♩ 𝅗𝅥. 𝅗𝅥 𝅗𝅥 𝅗𝅥. ♩ 𝅝	4/4	𝅝 ♩ 𝅗𝅥. 𝄼 𝅗𝅥 𝄼 ♩ 𝅝
18	𝅝 𝄽 𝅗𝅥. 𝄼 𝅗𝅥 𝅗𝅥. 𝄽 𝅝	4/4	𝅝 𝄽 𝅗𝅥. 𝅗𝅥 𝄼 𝅗𝅥. ♩ 𝅝
19	𝄻 𝅝 ♩ 𝅗𝅥. 𝄼 𝅗𝅥 𝅗𝅥. ♩	4/4	𝅝 𝅝 ♩ 𝅗𝅥. 𝅗𝅥 𝅗𝅥 𝅗𝅥. ♩
20	𝅝 𝅝 ♩ 𝅗𝅥. 𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝅗𝅥. ♩ 𝅝 𝅝	4/4	𝅝 𝅝 𝄽 𝅗𝅥. 𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝄼 𝄽 ♩ 𝅝 𝅝

TABLE 3--Continued

Flash Card No.	Form A	Time	Form B
21	𝅝 𝅝 𝅝 ♩ 𝅗𝅥. 𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝅗𝅥. ♩ 𝅝	4/4	𝅝 𝅝 𝅝 ♩ 𝄼 𝄽 𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝅗𝅥. 𝄽 𝅝
22	𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥 ♩ 𝅗𝅥.	3/4	𝅗𝅥. ♩ 𝄼 𝅗𝅥 ♩ 𝅗𝅥.
23	𝅗𝅥. 𝄽 𝅗𝅥 𝅗𝅥 ♩ 𝅗𝅥.	3/4	𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥 𝄽 𝅗𝅥.
24	𝅗𝅥. 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥 ♩	3/4	𝅗𝅥. 𝄻 ♩ 𝅗𝅥 𝅗𝅥 ♩
25	𝅝 𝅗𝅥. ♩ 𝅝 𝅗𝅥 𝅗𝅥 𝅝 ♩ 𝅗𝅥. 𝅝	C	𝅝 𝅗𝅥. 𝄽 𝅝 𝅗𝅥 𝄼 𝅝 ♩ 𝄼. 𝅝
26	𝅝 𝄼. ♩ 𝅝 𝄼 𝅗𝅥 𝅝 𝄽 𝅗𝅥. 𝅝	C	𝅝 𝅗𝅥. ♩ 𝄻 𝅗𝅥 𝅗𝅥 𝄻 𝄽 𝅗𝅥. 𝅝
27	𝅝 𝅝 𝅗𝅥. ♩ 𝅝 𝅗𝅥 𝅗𝅥 𝅝 ♩ 𝅗𝅥.	C	𝅝 𝅝 𝅗𝅥. 𝄽 𝄻 𝅗𝅥 𝄼 𝅝 ♩ 𝅗𝅥.
28	𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥.	3/4	𝅗𝅥. 𝅗𝅥 𝄽𝄻 ♩ 𝅗𝅥 𝅗𝅥.
29	𝅗𝅥. 𝄼 ♩ 𝅗𝅥. 𝄽 𝅗𝅥 𝅗𝅥.	3/4	𝅗𝅥. 𝄼 ♩ 𝄻 ♩ 𝄼 𝅗𝅥.
30	𝅗𝅥. 𝄻 𝅗𝅥 𝄽 𝅗𝅥. 𝄽 𝅗𝅥	3/4	𝅗𝅥. 𝅗𝅥. 𝄼 ♩ 𝅗𝅥. ♩ 𝅗𝅥
31	𝅗𝅥. 𝄻 ♩ 𝅗𝅥 𝄻 𝅗𝅥 ♩ 𝄻 𝅗𝅥.	3/4	𝅗𝅥. 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. 𝅗𝅥.
32	𝅗𝅥. 𝄻 𝅗𝅥 ♩ 𝅗𝅥. 𝄻 ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥.	3/4	𝅗𝅥. 𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥.
33	𝅗𝅥. 𝄻 ♩ 𝄼 𝅗𝅥. 𝄼 ♩ 𝄻 𝅗𝅥.	3/4	𝅗𝅥. 𝅗𝅥. 𝄽 𝅗𝅥 𝄻 𝅗𝅥 𝄽 𝄻 𝅗𝅥.
34	𝅗𝅥. 𝄻 𝅗𝅥. 𝄽 𝅗𝅥 𝄻 𝅗𝅥 𝄽 𝅗𝅥.	3/4	𝅗𝅥. 𝅗𝅥. 𝄻 ♩ 𝄼 𝅗𝅥. 𝄼 ♩ 𝅗𝅥.
35	𝅗𝅥. 𝅗𝅥. 𝄻 𝄽 𝅗𝅥 𝅗𝅥. 𝄼 𝄽 𝅗𝅥.	3/4	𝅗𝅥. 𝅗𝅥. 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥.
36	𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. ♩ 𝅗𝅥 𝅗𝅥.	5/4	𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. 𝄽 𝄼 𝅗𝅥.
37	𝅗𝅥 𝅗𝅥. 𝅗𝅥. 𝄼 𝄽 𝅗𝅥. ♩	5/4	𝅗𝅥 𝅗𝅥. 𝅗𝅥. 𝅗𝅥 ♩ 𝅗𝅥. ♩
38	𝅝‿♩ ♩ 𝅝 𝅗𝅥. 𝅗𝅥 𝅗𝅥 𝅗𝅥. 𝅝 ♩ ♩‿𝅝	5/4	𝅝‿♩ ♩ 𝅝 𝄼. 𝅗𝅥 𝅗𝅥 𝅗𝅥. 𝅝 ♩ ♩‿𝅝
39	♩‿𝅝 𝅝‿♩ 𝄽 𝅝 𝅗𝅥. 𝄼 𝅗𝅥 𝅗𝅥. 𝅝 ♩	5/4	♩‿𝅝 ♩‿𝅝 ♩ 𝅝 𝄼. 𝅗𝅥 𝄼 𝅗𝅥. 𝅝 ♩
40	𝅝 𝅝 𝅗𝅥 𝅗𝅥 𝅝 𝅝	¢	𝅝 𝄻 𝅗𝅥 𝅗𝅥 𝅝 𝅝
41	𝅝 𝅝 𝄼 𝅗𝅥 𝅝 𝅝	¢	𝅝 𝅝 𝅗𝅥 𝄼 𝅝 𝅝
42	𝅝 𝄻 𝅝 𝄼 𝅗𝅥 𝅝	¢	𝅝 𝅝 𝄻 𝅗𝅥 𝄼 𝅝

TABLE 3--Continued

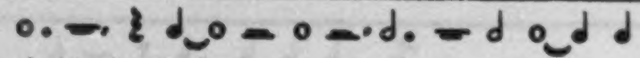
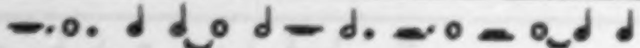
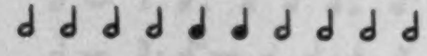
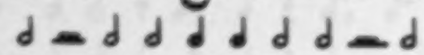
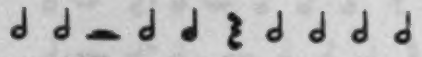
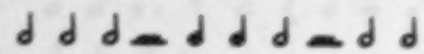
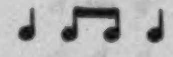
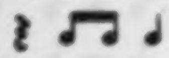
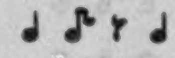
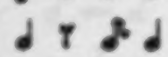
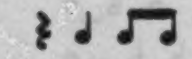
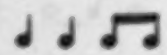
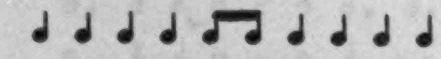
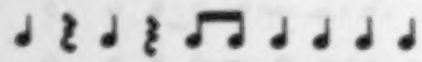
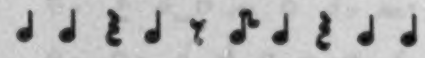
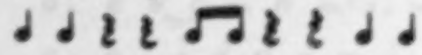
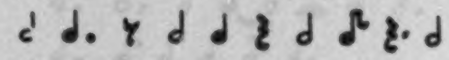
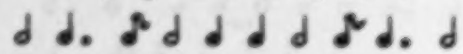
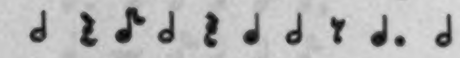
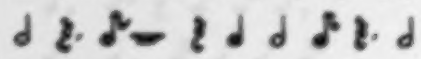
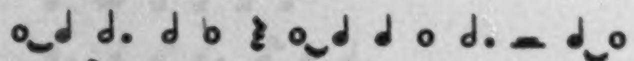
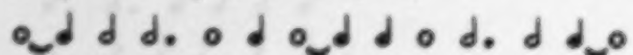
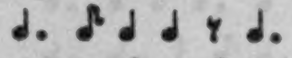
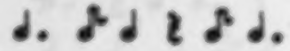
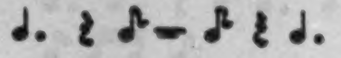
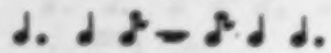
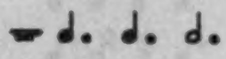
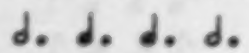
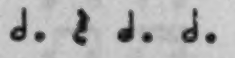
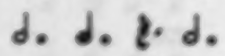
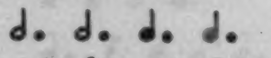
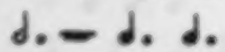
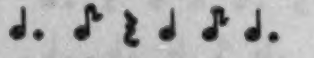
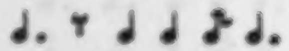
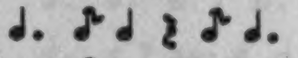
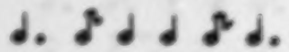
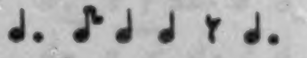
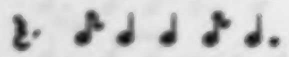
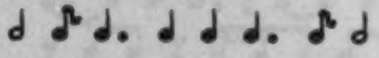
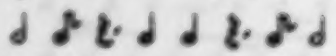
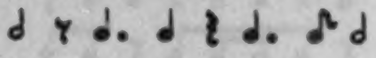
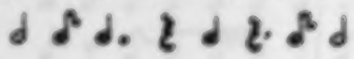
Flash Card No.	Form A	Time	Form B
43		6/4	
44		3/2	
45		3/2	
46		3/4	
47		3/4	
48		3/4	
49		3/4	
50		3/4	
51		2/4	
52		2/4	
53		5/4	
54		3/8	
55		3/8	
56		6/8	
57		6/8	
58		6/8	
59		2/4	
60		2/4	
61		2/4	
62		2/4	
63		2/4	

TABLE 3--Continued

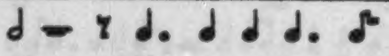
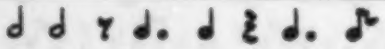
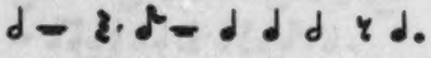
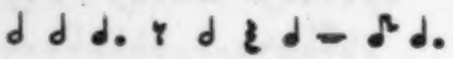
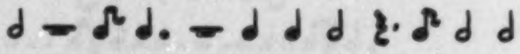
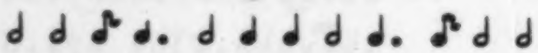
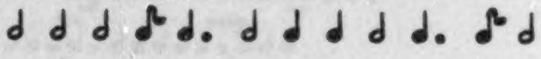
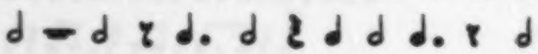
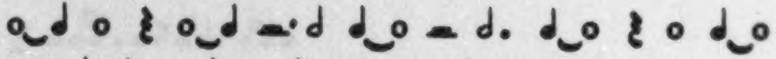
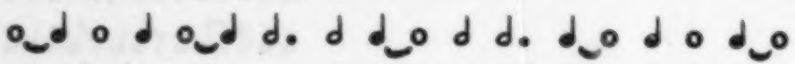
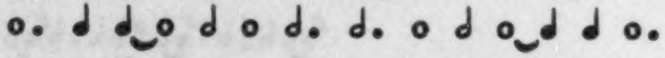
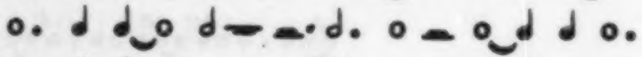
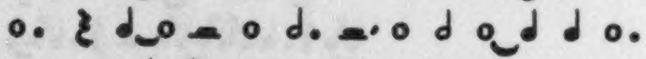
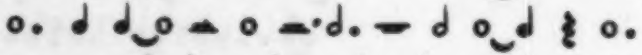
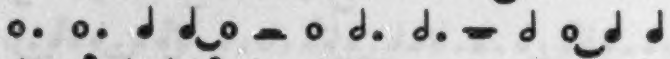
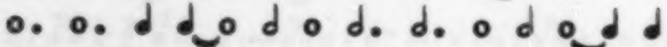
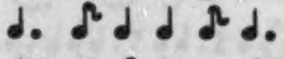
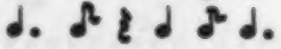
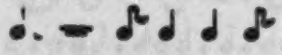
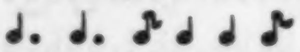
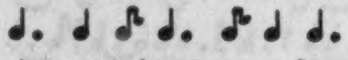
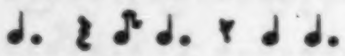
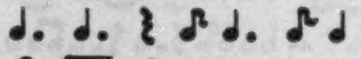
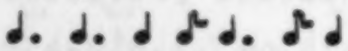
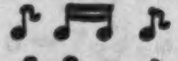
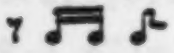
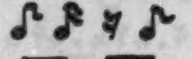
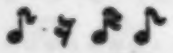
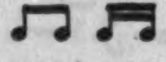
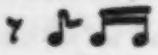
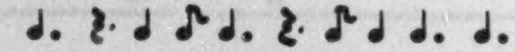
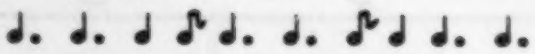
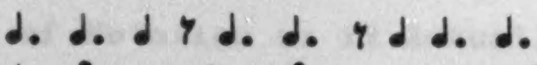
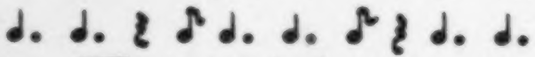
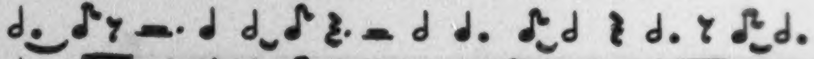
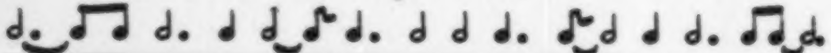
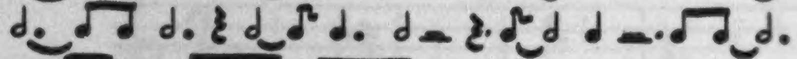
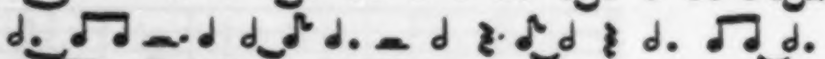
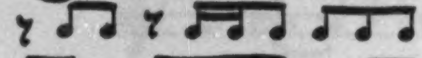
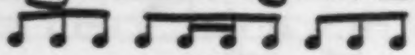
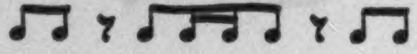
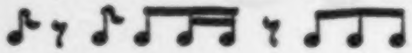
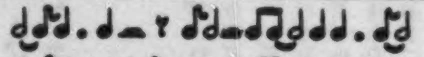
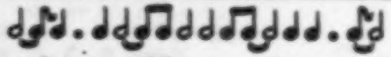
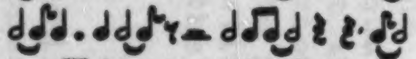
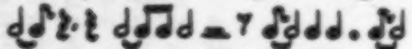
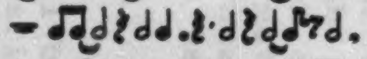
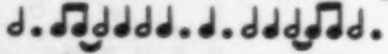
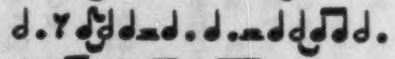
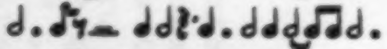
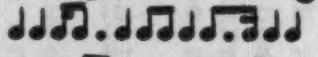
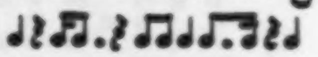
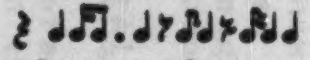
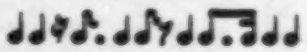
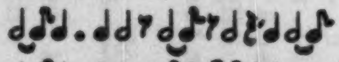
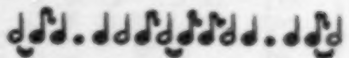
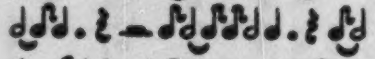
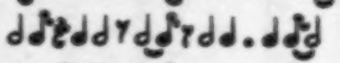
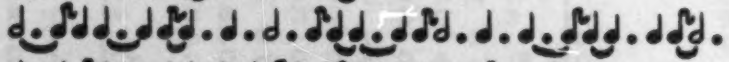
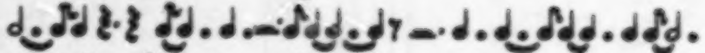
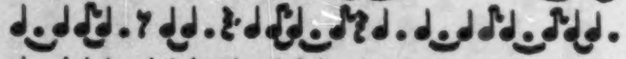
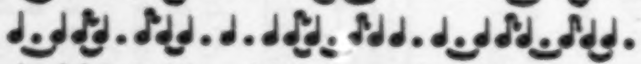
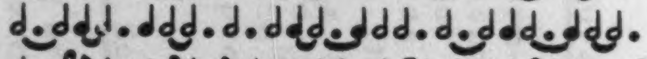
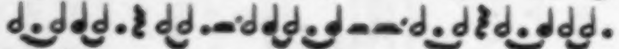
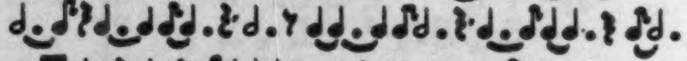
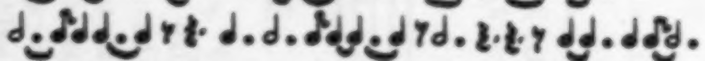
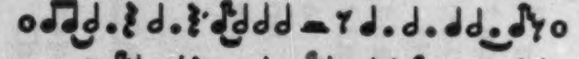
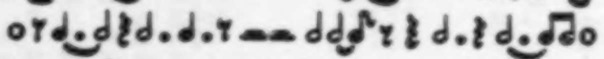
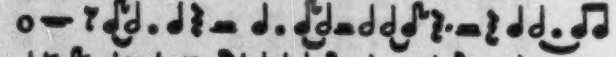
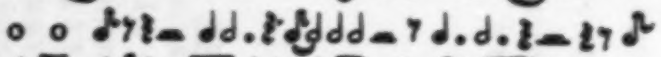
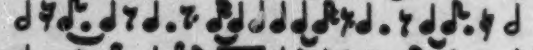
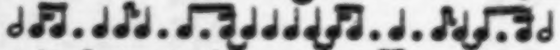
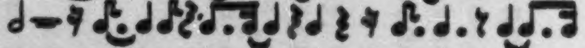
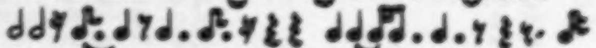
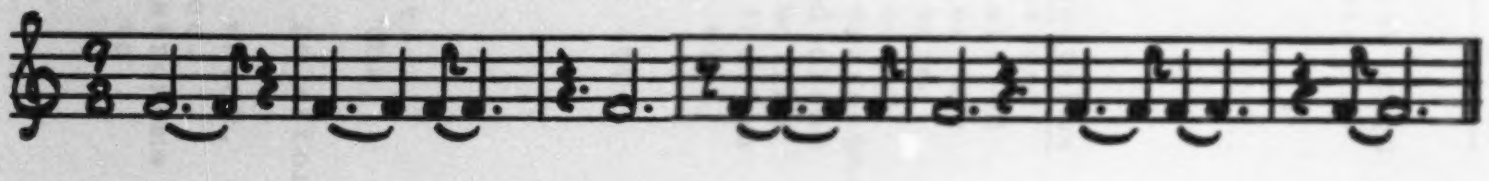
Flash Card No.	Form A	Time	Form B
64		2/4	
65		2/4	
66		2/4	
67		2/4	
68		5/4	
69		6/4	
70		6/4	
71		6/4	
72		3/8	
73		3/8	
74		3/8	
75		3/8	
76		3/8	
77		3/8	
78		3/8	
79		12/8	
80		12/8	
81		4/4	
82		4/4	
83		9/8	
84		9/8	

TABLE 3--Continued

Flash Card No.	Form A	Time	Form B
85		4/4	
86		4/4	
87		6/8	
88		6/8	
89		3/4	
90		3/4	
91		5/8	
92		5/8	
93		9/8	
94		9/8	
95		9/4	
96		9/8	
97		4/4	
98		4/4	
99		2/4	
100		2/4	

Example of Notation as it Actually Appeared:



TESTING DATA FORM

Name of Student____________________ Age___(years)___(months)

Grade in School______Name of School________________________

City______________________Student's Instrument_____________

Experience on Instrument___(years)___(months)

Please indicate on the staff provided, the proper clef sign and the range at which this student can perform on his instrument with ease.

Testing Equipment

Each test administrator should have two copies of two forms of the test, Form A which is to be administered first and Form B which is to be administered within approximately 48 hours after Form A. One copy of each form will be for the personal use of the administrator and will have the word "administrator" written on the outside cover. The second copy of each form will be used by the student as he takes the test. The two forms of the test must be administered close together to prevent natural growth patterns from affecting the correlation of these two forms. In addition to the two copies of the two test forms, the test administrator will need the following equipment:

1. One pocket metronome
2. One music stand
3. Two chairs
4. One stop watch (or equivalent)
5. One pencil

Testing Procedure

1. Give the student time to "warm-up" his instrument.
2. Seat the student facing a music stand and adjust the stand to a height suitable for clear vision.
3. Present two sample flash cards to the student in an effort to acquaint the student with the test.
4. Permit the student 5 seconds, as timed by a stop watch, to review each new flash card prior to performance.
5. Set the metronome speed at "88" and permit the metronome to continue throughout each problem in an effort to keep the tempo consistent.

General Rules for Scoring

The test will be scored in terms of response to the total pattern appearing on the flash card. This is to say that if the individual misses a note or rest he has failed the total problem and should be stopped at the point of error so that he can proceed with the next problem. This will permit the test administrator to expedite the administration and scoring of the test. Considerations for scoring are as follows:

1. Make sure that you are using the proper test form and scoring sheet.
2. Please observe that each flash card is numbered in the upper right hand corner.
3. Please turn to your scoring sheet and observe that each scoring sheet has vertical columns containing numbers which correspond with the numbers in the upper right hand corner of the flash cards.
    A. To score a PASS, place a check mark (✓) directly under the column marked "P" for pass and directly to the right of the number which corresponds with the number on your flash card.
    B. To score a FAIL, place the number of the note or rest missed under the column "F" for fail and to the right of the number on the scoring sheet which corresponds with the number on the flash card.

    Turn to your administrator's test forms and note that numbers have been placed directly below the notes and rests on the administrator's test forms only. This has been done to assist the administrator in scoring, and every effort should be made to prevent the use of these forms by the student.

Standards for Scoring

1. Time

    Any note which is NOT held for its proper value (time is set by the metronome) will be considered an error. Thus, a sustained tone of four beats cannot be considered properly played unless it is held for four beats. It must be remembered that the metronome sets the standard for differentiation between properly and improperly played.

2. Tie

    A tie shall not be considered correctly played if it is tongued, omitted, held too long, or held, but not long enough.

3. Rest

    It shall be considered an error to sustain, ignore, or hold a rest for incorrect periods of time.

SCORING SHEET

Test I - Form A

	P	F		P	F		P	F		P	F
1			26			51			76		
2			27			52			77		
3			28			53			78		
4			29			54			79		
5			30			55			80		
6			31			56			81		
7			32			57			82		
8			33			58			83		
9			34			59			84		
10			35			60			85		
11			36			61			86		
12			37			62			87		
13			38			63			88		
14			39			64			89		
15			40			65			90		
16			41			66			91		
17			42			67			92		
18			43			68			93		
19			44			69			94		
20			45			70			95		
21			46			71			96		
22			47			72			97		
23			48			73			98		
24			49			74			99		
25			50			75			100		

SCORING SHEET

Test II - Form B

P F

1 ___ ___
2 ___ ___
3 ___ ___
4 ___ ___
5 ___ ___
6 ___ ___
7 ___ ___
8 ___ ___
9 ___ ___
10 ___ ___
11 ___ ___
12 ___ ___
13 ___ ___
14 ___ ___
15 ___ ___
16 ___ ___
17 ___ ___
18 ___ ___
19 ___ ___
20 ___ ___
21 ___ ___
22 ___ ___
23 ___ ___
24 ___ ___
25 ___ ___

P F

26 ___ ___
27 ___ ___
28 ___ ___
29 ___ ___
30 ___ ___
31 ___ ___
32 ___ ___
33 ___ ___
34 ___ ___
35 ___ ___
36 ___ ___
37 ___ ___
38 ___ ___
39 ___ ___
40 ___ ___
41 ___ ___
42 ___ ___
43 ___ ___
44 ___ ___
45 ___ ___
46 ___ ___
47 ___ ___
48 ___ ___
49 ___ ___
50 ___ ___

P F

51 ___ ___
52 ___ ___
53 ___ ___
54 ___ ___
55 ___ ___
56 ___ ___
57 ___ ___
58 ___ ___
59 ___ ___
60 ___ ___
61 ___ ___
62 ___ ___
63 ___ ___
64 ___ ___
65 ___ ___
66 ___ ___
67 ___ ___
68 ___ ___
69 ___ ___
70 ___ ___
71 ___ ___
72 ___ ___
73 ___ ___
74 ___ ___
75 ___ ___

P F

76 ___ ___
77 ___ ___
78 ___ ___
79 ___ ___
80 ___ ___
81 ___ ___
82 ___ ___
83 ___ ___
84 ___ ___
85 ___ ___
86 ___ ___
87 ___ ___
88 ___ ___
89 ___ ___
90 ___ ___
91 ___ ___
92 ___ ___
93 ___ ___
94 ___ ___
95 ___ ___
96 ___ ___
97 ___ ___
98. ___ ___
99 ___ ___
100 ___ ___

University of Southern Mississippi

In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

August 15, 1962

Letter #1
Administrator's Name
Name of School
City

Dear ________________:

The University of Southern Mississippi in cooperation with the U.S. Department of Health, Education, and Welfare is presently engaged in research directed toward the development of an objective instrument designed to measure musical achievement. Since your school is one which has been selected as meeting all the criteria for this study, we earnestly solicit your cooperation in gathering data essential to this project. Special steps have been taken to avoid consuming time so precious to your administrative duties. In keeping with this policy Dr. Raymond Mannoni, Chairman of the Division of Fine Arts, will visit your school within the next few days and with your permission furnish information which will assist you in better understanding our project and the importance of this project to the university and to the nation.

Through the efforts of the Chairman of the Division of Fine Arts, it will be possible for the university to offer graduate credit to those music directors who participate in this study. Many of the directors have already been contacted through a music work-shop held at the University of Southern Mississippi. If for some reason your music director did not participate in this activity, we shall make every effort to contact him in the near future and to solicit his cooperation at that time.

Sincerely yours,

Kenneth Urial Gutsch, Director
Research Project #1734

Raymond Mannoni, Associate Director
Research Project #1734 and
Chairman of the Division of Fine Arts

University of Southern Mississippi
In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

August 17, 1962

Letter #2
Name of Music Director
Name of School
City

Dear ________________:

The University of Southern Mississippi in cooperation with the U.S. Department of Health, Education, and Welfare is presently engaged in the development of an objective instrument designed to measure musical achievement. Since your school is one which has been selected as meeting all the criteria for this study, we earnestly solicit your cooperation in gathering data essential to this project. We realize that the responsibilities of the music directors in this area are many and varied; consequently, special steps have been taken to avoid any needless consumption of your time. In keeping with this policy Mr. Joseph Berryman, a member of our research team, will contact you shortly in an effort to outline the project relative to your particular situation.

Through the efforts of the Chairman of the Division of Fine Arts, and as an added incentive to you people, Dr. Raymond Mannoni has made provisions to offer graduate credit to those music directors who participate in this study. Since our commitment to this project was based upon our faith in the ability of the music directors in this area, we earnestly solicit your cooperation in making this a highly meaningful and successful research project.

Sincerely yours,

____
Kenneth Urial Gutsch, Director
Research Project #1734

____
Raymond Mannoni, Associate Director
Research Project #1734 and
Chairman of the Division of Fine Arts

University of Southern Mississippi
In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

August 20, 1962

Letter #3
Administrator's Name
Name of School
City

Dear ________________:

Recently we wrote to you regarding a research project now being carried out through the joing efforts of the University of Southern Mississippi and the U.S. Department of Health, Education, and Welfare. In an effort to establish greater rapport with the administrators of each school and in order to answer any questions you might now have relative to our project, Dr. Raymond Manneni, Chairman of the Division of Fine Arts and Associate Director of Research for this project, and Mr. Steve Saxon, an investigator on our research team, will be visiting schools in your area the latter part of August. If for any reason this is not a convenient meeting time, please contact Dr. Raymond Manneni at your earliest convenience so that a revised itinerary can be worked out.

Sincerely yours,

____
Kenneth Urial Gutsch, Director
Research Project #1734

____
Raymond Manneni, Associate Director
Research Project #1734 and
Chairman of the Division of Fine Arts

KG:lm

GENERAL INFORMATION DATA FORM

NAME OF SCHOOL________________________________ Date______________

Directions: Please complete the following information for each BAND student who is now attending your institution. When this information has been completed, kindly return the information to Dr. Kenneth Urial Gutsch, Director

Research Project #1734
Box 187
University of Southern Mississippi
Hattiesburg, Mississippi

INFORMATION

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

Student's Name_________________________ Grade_____ I.Q. Score___
Name of I.Q. Test_________________ Circle Scholastic Average
A B C D F

....

University of Southern Mississippi
In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

October 6, 1962

Letter #4
Administrator's Name
Name of School
City

Dear ________________:

I enjoyed very much my recent visit at your institution. My sincere appreciation for your willingness to assist us with our research project.

I left a data form to be completed and returned to Dr. K. U. Gutsch, Director of the research project on music testing which is now being carried out by the University of Southern Mississippi in cooperation with the U.S. Department of Health, Education, and Welfare. Most of the schools have already responded by completing and returning this information. If your school is one that has responded, please disregard this letter. If you have not completed the data form, we would appreciate any effort on your part to expedite this matter at your earliest convenience. Total cooperation on this project will reflect well the ability of the schools and the school administrators in this area of the state to undertake and support pertinent research sponsored by national funds. It is research of this type which makes scholarships and assistantships available to worthy students while at the same time bringing national status, prestige, and recognition to our university.

Best wishes for a fine school year; I shall look forward to hearing from you in the very near future.

Sincerely yours,

Raymond Mannoni, Chairman
Division of Fine Arts

RM:ng

1910

University of Southern Mississippi
In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

October 24, 1962

Letter #5
Name of Music Director
Name of School
City

Dear ________________:

During the month of August, we informed you of a research study now being conducted by the University of Southern Mississippi in cooperation with the U.S. Department of Health, Education, and Welfare. As we stated at that time, the study is directed toward the development of a test which will measure one specific component of musical achievement. Since August we have made considerable advances in our test design and feel that we are now in a position to solicit the active participation of the music directors in the university area. Relative to such a proposition, we will hold an orientation program on Saturday, November 3 at 9:30 A.M. in Marsh Auditorium which is located in the Fine Arts Building here on the campus of the University of Southern Mississippi. Provisions have been made to reimburse each music director cooperating with this study, and participating in this special orientation program, at the rate of seven cents per mile for travel from his school to the University of Southern Mississippi and back to his school. The orientation program, which will last approximately two hours, will be conducted by Mr. Joe Berryman and will permit each music director an opportunity to become familiar with the administration and scoring of the test. Dr. Raymond Mannoni, Chairman of the Division of Fine Arts, will be present to explain how music instructors interested in obtaining graduate music credit for their participation in this study can enroll for such credit at the University of Southern Mississippi.

We want to thank you for the cooperation you have given us and hope that your personal participation in this study will be of personal value to you.

Sincerely yours,

Kenneth Urial Gutsch, Director
Research Project #1734

Raymond Mannoni, Associate Director
Research Project #1734
Director of the Division of Fine Arts

KG:ng

University of Southern Mississippi
In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

November 17, 1962

Letter #6
Name of Music Director
Name of School
City

Dear ________________:

In our most recent letter of October 24, we solicited your participation in an orientation program designed to assist music directors in understanding the administration and scoring of the music test constructed through the cooperative efforts of the University of Southern Mississippi and the U.S. Department of Health, Education, and Welfare. For those of you who attended the first orientation program and now have questions relative to the test or for those of you who missed that meeting and who now want to become part of this research project, a second orientation program will be held on Saturday, December 1, from 9:30 A.M. to 11:30 A.M. in Room 218 of the Fine Arts Building.

Once again I shall remind you that provisions have been made through Research Project #1734 to reimburse those music directors who attend this meeting and who cooperate in this study at the rate of seven cents per mile from the high school at which the director works to the University of Southern Mississippi and back to the high school.

This will be our last meeting before the second quarter begins. If you are contemplating enrolling for graduate music credit, application forms for such credit will be available. Dr. Raymond Mannoni, Chairman of the Division of Fine Arts, has made special provisions for students cooperating in this study to earn up to six quarter hours in the area of music. He encourages anyone who is interested in obtaining graduate music credit to enroll immediately so that this study might be expedited.

Sincerely yours,

____
Kenneth Urial Gutsch, Director
Research Project #1734

KG:ng

University of Southern Mississippi
In Cooperation With The U.S. Department of
Health, Education, and Welfare
Southern Station, Box 187
Hattiesburg, Mississippi

Research Project No. 1734

Letter #7

MEMORANDUM TO: Music Directors engaged in Research Project #1734

FROM: Kenneth Urial Gutsch, Director of Project

DATE: March, 1963

Starting this week a representative of our research team will visit your school and will pick up your data forms once every three weeks. This will assist us in processing these materials and will expedite our study considerably.

In an effort to establish scorer reliability we are asking each band director or test administrator to tape 10 per cent of his students randomly sampled from the total group. When you tape be sure that you record

1. The name of the person taking the test.
2. The form of the test being administered.

After you have completed recording, please give your tape to Mr. Joe Berryman. If the tapes are yours, they will be returned to you within two weeks. If you have any difficulty with this procedure, please contact Mr. Berryman and he will make every effort to assist you. His address is Box 271, University of Southern Mississippi.

TABLE 4

CONVERSION TABLE: TO CONVERT ORIGINAL FORM OF TEST INTO 1st OR 2nd REORDERINGS

Numerical Order of Flash Cards					
Original	1st Reordering	2nd Reordering	Original	1st Reordering	2nd Reordering
1	1	1	30	26	29
2	6	3	31	39	16
3	4	5	32	36	51
4	8	8	33	37	31
5	11	9	34	38	40
6	2	2	35	40	65
7	9	13	36	48	47
8	7	7	37	45	32
9	3	4	38	62	48
10	14	15	39	54	52
11	15	18	40	17	33
12	5	6	41	34	34
13	18	26	42	41	46
14	12	22	43	80	78
15	28	12	44	49	54
16	42	45	45	65	63
17	19	11	46	10	24
18	29	21	47	52	55
19	32	14	48	23	28
20	35	39	49	24	36
21	20	10	50	55	61
22	21	25	51	69	72
23	16	19	52	79	86
24	13	17	53	59	50
25	33	30	54	64	53
26	44	23	55	57	58
27	30	37	56	43	38
28	22	27	57	47	43
29	31	42	58	25	44

TABLE 4--Continued

Numerical Order of Flash Cards					
Original	1st Reordering	2nd Reordering	Original	1st Reordering	2nd Reordering
59	73	84	80	85	82
60	66	60	81	88	83
61	60	66	82	91	89
62	68	74	83	82	81
63	76	49	84	84	75
64	74	85	85	89	88
65	70	69	86	83	80
66	67	64	87	86	76
67	61	62	88	81	90
68	63	67	89	90	87
69	75	73	90	93	92
70	71	70	91	78	79
71	72	71	92	77	68
72	58	59	93	98	97
73	53	41	94	97	96
74	50	57	95	87	93
75	51	77	96	96	94
76	27	20	97	95	95
77	56	56	98	94	98
78	46	35	99	99	99
79	92	91	100	100	100

APPENDIX B

MATRICES OF INTERCORRELATIONS FOR SUCH SELECTED VARIABLES AS I.Q., SCHOLASTIC AVERAGE, GRADE IN SCHOOL, INSTRUMENTAL MUSIC EXPERIENCE, AND AGE

TABLE 5

MATRIX OF INTERCORRELATIONS FOR SELECTED VARIABLES
(FORM A ADMINISTERED FIRST)

	Form A	Form B	I.Q.	Scholastic Average	Grade	Experience	Age
Form A	—	.9683*	.2916*	.2936*	.4257*	.7397*	.3741*
Form B	.9683*	—	.3077*	.2759*	.4166*	.7227*	.3624*
I.Q.	.2916*	.3077*	—	.4696*	.0495	.2578*	-.0282
Scholastic Average	.2936*	.2759*	.4696*	—	-.1265**	.2087*	-.1596*
Grade	.4257*	.4166*	.0495	-.1265**	—	.5206*	.9580*
Experience	.7397*	.7227*	.2578*	.2087*	.5206*	—	.4611*
Age	.3741*	.3624*	-.0282	-.1596*	.9580*	.4611*	—

*Significant at the .01 level
**Significant at the .05 level

TABLE 6

MATRIX OF INTERCORRELATIONS FOR SELECTED VARIABLES
(FORM B ADMINISTERED FIRST)

	Form A	Form B	I.Q.	Scholastic Average	Grade	Experience	Age
Form A	—	.9637*	.2191*	.1337**	.4803*	.7173*	.3908*
Form B	.9637*	—	.2034*	.1295**	.4933*	.7354*	.4036*
I.Q.	.2191*	.2034*	—	.3797*	.0165	.1314**	-.0378
Scholastic Average	.1337**	.1295**	.3797*	—	-.2701*	.0314	-.3204*
Grade	.4803*	.4933*	.0165	-.2701*	—	.6276*	.9236*
Experience	.7173*	.7354*	.1314**	.0314	.6276*	—	.5409*
Age	.3908*	.4036*	-.0378	-.3204*	.9236*	.5409**	—

*Significant at the .01 level
**Significant at the .05 level

TABLE 7

MATRIX OF INTERCORRELATIONS FOR SELECTED VARIABLES (WHEN FORMS ARE COMBINED)

	Form A	Form B	I.Q.	Scholastic Average	Grade	Experience	Age
Form A	———	.9237*	.2224*	.1980*	.4307*	.7174*	.3608*
Form B	.9237*	———	.2648*	.2080*	.4592*	.7220*	.3874*
I.Q.	.2224*	.2648*	———	.4229*	.0386	.1877*	-.0244
Scholastic Average	.1980*	.2080*	.4229*	———	-.1982*	.1155*	-.2404*
Grade	.4307*	.4592*	.0386	-.1982*	———	.5761*	.9391*
Experience	.7174*	.7220*	.1877*	.1155*	.5761*	———	.5023*
Age	.3608*	.3874*	-.0244	-.2404*	.9391*	.5023*	———

*Significant at the .01 level

APPENDIX C

SCORER RELIABILITY AS DETERMINED BY FOUR ACADEMICALLY TRAINED JUDGES

TABLE 8

SCORER RELIABILITY: CORRELATIONS OF JUDGES' RATINGS WITH THOSE OF TEST ADMINISTRATORS ON A RANDOMLY SELECTED SAMPLE OF TAPE RECORDED SESSIONS

Test Administrator	Judge 1	Judge 2	Judge 3	Judge 4
I	.996	.996	.996	.998
II	.999	.998	.998	.999
III	.999	.999	.999	.999
IV	.999	.999	.999	.999
V	.999	.999	.999	.999
VI	.995	.995	.995	.995
VII	.999	.999	.999	.999

Note: When the ratings of individual judges were compared to determine consistency, as they rated each of the seven tapes, their ratings were found to correlate equally high, with no correlation coefficient below .998.

APPENDIX D

LEVELS OF SIGNIFICANT DIFFERENCES IN THE PERFORMANCE OF SUBJECTS RELATIVE TO EXPERIENCE; MEAN SCORES AND STANDARD DEVIATIONS BY EXPERIENCE LEVELS

TABLE 9

MEAN SCORES AND STANDARD DEVIATIONS BY EXPERIENCE LEVELS: BASED ON COMBINED FORMS FOR 771 SUBJECTS

Experience in Years	Subjects	Mean Score	Standard Deviation
0-1	95	36.52	15.97
1-2	131	50.96	18.28
2-3	107	55.47	13.42
3-4	125	64.22	12.45
4-5	103	69.18	12.87
5-6	70	73.45	11.58
6-7	52	80.63	9.48
7-8	54	85.00	10.62
8-9	34	86.61	6.61

TABLE 10

LEVELS OF SIGNIFICANT DIFFERENCES IN THE PERFORMANCE OF SUBJECTS RELATIVE TO EXPERIENCE

		Years Experience								
		0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9
Years Experience	0-1	—	.01	.01	.01	.01	.01	.01	.01	.01
	1-2	.01	—	.05	.01	.01	.01	.01	.01	.01
	2-3	.01	.05	—	.01	.01	.01	.01	.01	.01
	3-4	.01	.01	.01	—	.01	.01	.01	.01	.01
	4-5	.01	.01	.01	.01	—	.05	.01	.01	.01
	5-6	.01	.01	.01	.01	.05	—	.01	.01	.01
	6-7	.01	.01	.01	.01	.01	.01	—	.01	.01
	7-8	.01	.01	.01	.01	.01	.01	.01	—	.01
	8-9	.01	.01	.01	.01	.01	.01	.01	.01	—

Note: In all cases the significance was equal to or greater than the level indicated.

APPENDIX E

A COMPARATIVE ANALYSIS OF NORM TABLES BY EXPERIENCE LEVEL

TABLE 11

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH SIX WEEKS TO ONE YEAR OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
1	1	1	2	1	1
5	1	2	4	1	2
7	1	3	8	1	3
11	2	5	9	1	4
13	1	6	12	2	6
14	2	8	13	2	8
16	3	12	14	1	9
17	2	14	16	2	12
19	1	15	19	1	13
20	3	18	20	3	16
21	3	21	21	2	18
22	3	24	22	3	21
23	1	25	23	1	22
25	2	27	24	2	24
26	1	28	25	2	26
27	4	33	26	3	29
29	2	35	27	1	31
30	3	38	28	2	33
31	2	40	29	2	35
32	2	42	30	2	37
34	2	44	31	2	39
35	2	46	32	3	42
36	1	47	33	2	44
37	1	48	34	3	47
38	2	51	35	2	49
39	6	57	36	1	51

TABLE 11--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
41	3	60	38	5	56
42	2	62	39	3	59
43	2	64	40	2	61
44	3	67	41	2	63
45	2	69	42	2	65
46	3	73	43	3	68
47	1	74	44	2	71
48	1	75	45	1	72
49	2	77	46	4	76
50	4	81	47	2	78
51	2	83	48	3	81
52	4	87	49	1	82
54	2	89	50	4	86
55	1	91	52	2	88
56	1	92	54	1	89
57	1	93	55	2	92
58	1	94	56	2	94
59	1	95	58	2	96
62	1	96	62	1	97
67	1	97	65	1	98
70	1	98	69	1	99
73	1	99	78	1	100
81	1	100	81		

TABLE 12

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH ONE YEAR TO TWO YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
13	1	1	12	2	2
15	1	2	18	1	2
16	2	3	19	1	3
17	1	4	21	2	5
18	2	5	24	1	5
19	1	6	25	3	8
20	2	8	26	1	8
22	1	8	27	2	10
23	2	10	29	2	11
25	2	11	30	1	12
26	1	12	31	2	14
28	1	13	32	1	15
29	2	15	33	2	16
30	1	15	34	4	19
31	2	17	35	4	22
32	1	18	36	2	24
33	3	20	37	1	24
36	3	22	38	1	25
37	1	23	39	1	26
38	3	25	41	4	29
39	3	27	42	2	31
40	1	28	43	2	32
41	1	29	44	4	35
42	2	31	45	2	37
43	2	32	46	2	38
44	4	35	47	2	40
45	2	37	48	3	42
46	3	39	49	3	44

TABLE 12--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
47	7	44	50	3	47
48	2	46	51	3	49
49	4	49	52	2	50
50	1	50	53	2	52
51	2	51	54	2	53
52	2	53	55	2	55
53	3	55	56	6	60
54	3	57	57	1	60
56	3	60	58	6	65
57	1	60	59	6	69
58	6	65	60	1	70
59	1	66	61	3	73
60	3	68	62	5	76
61	4	71	63	2	78
62	1	72	64	3	80
64	2	73	66	3	82
65	1	74	67	1	83
66	1	75	68	2	85
67	3	77	69	1	85
68	5	81	70	2	87
70	3	83	72	1	88
71	1	84	73	1	89
72	4	87	74	1	89
73	3	89	75	3	92
75	2	91	77	3	94
76	1	92	78	2	95
77	2	93	79	1	96
78	3	95	82	1	97
79	1	96	84	1	98
81	2	98	85	1	98
85	1	98	87	1	99
87	1	99	89	1	100
89	1	100			

TABLE 13

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH TWO YEARS TO THREE YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
21	1	1	10	1	1
25	1	2	19	1	2
29	2	4	24	1	3
30	1	5	30	1	4
31	1	6	31	2	6
33	1	7	34	1	7
36	2	8	36	1	7
38	2	10	37	1	8
39	3	13	40	1	9
40	1	14	41	3	12
41	2	16	42	3	15
42	2	18	43	3	18
43	3	21	44	6	23
44	1	21	45	3	26
45	1	22	46	2	28
46	3	25	48	2	30
47	4	29	49	6	36
48	5	34	50	5	40
50	1	35	51	4	44
51	6	40	52	3	47
52	3	43	53	2	49
53	3	46	54	1	50
54	2	48	55	1	50
55	2	50	56	4	54
56	1	50	58	3	57
57	4	54	59	6	63
58	3	57	60	3	65
59	2	59	61	1	66

TABLE 13--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
60	2	61	62	3	69
61	2	63	63	2	71
62	2	64	64	2	73
63	1	65	65	1	74
64	4	69	67	3	77
65	5	74	68	3	79
66	4	78	69	3	82
67	1	79	70	2	84
68	3	81	71	1	85
69	1	82	73	4	89
70	1	83	74	4	93
71	3	86	76	1	93
72	6	92	77	1	94
74	1	93	79	3	97
75	2	94	80	2	99
76	1	95	81	1	100
77	3	98			
79	2	100			

TABLE 14

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH THREE YEARS TO FOUR YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
27	1	1	37	1	1
32	1	2	39	2	2
34	1	2	40	1	3
37	1	3	41	3	6
40	1	4	44	1	6
41	1	5	46	1	7
43	2	6	47	1	8
45	1	7	48	1	9
47	1	8	49	2	10
48	2	10	51	5	14
49	1	10	52	2	16
50	3	13	53	7	22
51	3	15	54	3	24
52	2	17	55	2	26
54	3	19	56	2	27
55	1	20	57	3	30
56	5	24	58	4	33
57	7	30	59	3	35
58	2	31	60	2	37
59	5	35	61	4	40
60	2	37	62	1	41
61	4	40	63	3	43
62	4	43	64	1	44
63	3	46	65	6	49
64	3	48	66	5	53
65	6	53	67	4	56

TABLE 14--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
66	5	57	68	8	62
67	4	60	69	4	66
68	5	64	70	3	68
69	2	66	71	2	70
70	4	69	72	2	71
71	3	71	73	3	74
72	4	74	74	2	75
73	3	77	75	3	78
74	1	78	76	2	79
75	7	83	77	4	82
76	1	84	78	3	85
77	3	86	79	3	87
79	2	88	80	2	89
80	2	90	81	2	90
81	2	91	82	2	92
82	4	94	83	1	93
83	1	95	85	2	94
84	2	97	88	1	95
85	1	98	89	1	96
88	2	99	90	1	97
95	1	100	91	1	98
96			92	1	98
			93	1	99
			95	1	100

TABLE 15

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH FOUR YEARS TO FIVE YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
35	1	1	26	1	1
40	1	2	42	1	2
43	2	4	43	2	4
44	1	5	44	1	5
49	1	6	45	1	6
50	2	8	46	3	9
52	2	10	47	1	10
53	1	11	48	1	11
54	3	14	50	1	12
55	2	16	54	2	14
56	1	17	56	1	15
57	2	18	57	3	17
58	1	19	59	2	19
59	1	20	60	3	22
60	7	27	61	5	27
61	1	28	62	5	32
62	3	31	63	4	36
63	1	32	64	5	41
64	3	35	65	3	44
65	4	39	66	4	48
66	5	44	68	3	50
67	2	46	69	2	52
68	3	49	70	2	54
69	1	50	71	1	55
70	4	53	72	5	60
71	1	54	73	2	62
72	4	58	74	4	66
73	2	60	75	5	71

TABLE 15--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
74	4	64	76	2	73
75	1	65	77	2	75
76	5	70	78	3	78
77	3	73	79	2	80
78	5	78	80	4	83
79	2	80	82	1	84
80	1	81	83	3	87
81	2	83	85	1	88
83	1	83	86	1	89
84	3	86	87	1	90
85	3	89	88	1	91
87	1	90	89	1	92
88	3	93	90	2	94
89	3	96	93	1	95
91	1	97	94	2	97
92	1	98	95	1	98
93	1	99	98	1	99
96	1	100	99	1	100

TABLE 16

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH FIVE YEARS TO SIX YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
29	1	1	44	1	1
48	1	3	50	1	3
52	1	4	54	1	4
53	1	6	55	1	6
55	2	9	58	2	9
59	1	10	59	3	13
60	2	13	61	2	16
63	1	14	62	1	17
64	1	16	64	3	21
65	3	20	67	3	26
66	2	23	68	2	29
67	2	26	69	3	33
68	1	27	70	3	37
69	2	30	71	3	41
70	5	37	72	2	44
72	4	43	73	5	51
73	3	47	74	1	53
74	2	50	75	1	54
75	4	56	77	2	57
76	2	59	78	4	63
77	2	61	79	4	69
78	2	64	80	1	70
79	3	69	81	1	71
80	3	73	82	2	74
81	3	77	83	2	77
82	3	81	85	2	80
83	2	84	86	2	83
84	3	89	87	4	89

TABLE 16--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
86	2	91	88	1	90
88	1	93	90	2	93
89	2	96	91	1	94
95	1	97	93	1	96
96	1	99	94	1	97
97	1	100	95	2	100

TABLE 17

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH SIX YEARS TO SEVEN YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
47	1	2	57	1	2
67	2	6	62	1	4
69	2	10	67	1	6
70	2	13	68	1	8
71	2	17	69	2	12
73	1	19	70	2	15
74	4	27	71	1	17
75	2	31	73	4	25
76	3	37	75	1	27
77	1	38	76	3	33
78	1	40	77	4	40
79	1	42	78	1	42
80	4	50	79	1	44
82	4	58	80	4	52
83	2	62	81	5	62
84	1	63	82	1	63
85	2	67	83	2	67
86	1	69	85	1	69
87	2	73	86	1	71
88	2	77	87	3	77
89	4	85	88	1	79
91	1	87	89	3	85
92	2	90	91	2	88
93	1	92	92	1	90
94	2	96	93	1	92
96	1	98	94	2	96
99	1	100	96	1	98
100			97	1	100

TABLE 18

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH SEVEN TO EIGHT YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
37	1	2	31	1	2
55	1	4	52	1	4
70	1	6	66	1	6
72	2	9	68	1	7
73	2	13	70	1	9
78	3	19	71	1	11
79	2	22	75	1	13
80	1	24	78	1	15
81	1	26	80	3	20
82	2	30	81	2	24
83	1	31	82	1	26
84	3	37	83	3	31
85	3	43	84	1	33
86	2	46	85	4	41
87	3	52	86	4	48
88	3	57	87	2	52
89	4	65	88	3	57
90	5	74	89	2	61
91	1	76	90	5	70
92	1	78	91	2	74
93	3	83	92	2	78
95	2	87	93	5	87
96	3	93	94	2	91
97	4	100	95	2	94
98			96	1	96
99			97	1	98
100			98	1	100

TABLE 19

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS WITH EIGHT YEARS TO NINE YEARS OF EXPERIENCE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
70	1	3	68	1	3
75	1	6	71	1	6
76	1	9	73	1	9
78	1	12	79	1	12
79	1	15	82	5	26
80	1	18	83	2	32
81	3	26	84	1	35
83	3	35	85	1	38
85	2	41	86	2	44
86	2	47	87	2	50
87	1	50	88	3	59
89	3	59	89	2	65
90	1	62	90	4	76
91	3	71	91	2	82
92	4	82	93	1	85
93	1	85	94	1	88
94	3	94	96	1	91
95	1	97	97	1	94
98	1	100	98	1	97
99			100	1	100

APPENDIX F

A COMPARATIVE ANALYSIS OF NORM TABLES BY AGE LEVEL

TABLE 20

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM NINE TO TEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
43	1	25	37	1	25
44	1	50	45	1	50
48	1	75	48	1	75
52	1	100	52	1	100

TABLE 21

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM TEN TO ELEVEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
43	1	6	41	1	6
45	2	17	43	1	11
47	1	22	46	1	17
50	1	28	49	1	22
53	1	33	50	2	33
54	2	44	51	2	44
57	1	50	52	1	50
58	1	56	54	1	56
63	1	61	58	1	61
65	1	67	60	1	67
68	1	72	62	1	72
70	2	83	63	1	78
71	1	89	65	1	83
72	2	100	66	1	89
			74	1	94
			89	1	100

TABLE 22

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM ELEVEN TO TWELVE YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
21	1	4	8	1	4
39	2	11	40	1	7
41	1	15	43	2	15
42	1	19	44	1	19
44	1	22	46	3	30
48	1	26	50	2	37
49	1	30	51	1	41
50	1	33	53	1	44
54	1	37	56	2	52
55	1	41	59	2	59
58	4	56	62	1	63
62	1	59	65	1	67
63	1	63	68	2	74
68	2	70	72	1	78
70	2	78	74	2	85
71	1	81	75	2	93
76	1	85	77	1	96
79	1	89	82	1	100
81	1	93			
87	1	96			
89	1	100			

TABLE 23

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM TWELVE TO THIRTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
1	1	1	2	1	1
11	1	2	4	1	2
13	2	4	12	2	4
14	2	6	13	1	5
16	4	10	16	1	6
19	1	11	19	1	7
21	1	12	20	1	8
22	2	14	21	1	9
23	1	15	22	2	11
25	2	17	23	1	12
26	2	19	24	3	15
27	4	23	25	1	16
29	2	25	26	1	17
32	1	25	28	2	19
34	1	26	29	3	22
35	1	27	31	3	25
36	1	28	32	1	25
38	4	32	33	1	26
39	5	37	34	4	30
40	1	38	35	2	32
41	1	39	36	2	34
43	2	41	38	2	36
44	2	43	39	2	38
45	2	45	40	1	39
46	1	46	41	4	43
47	1	47	42	1	44
48	3	50	43	2	46

TABLE 23--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
49	4	54	46	1	47
50	1	55	47	2	49
51	3	58	48	2	51
52	3	61	49	4	55
54	2	63	50	3	58
56	3	66	51	1	59
57	3	69	52	1	60
58	1	70	53	1	61
61	2	72	54	1	62
62	1	73	55	2	64
63	1	74	56	3	67
64	1	75	58	3	70
65	2	76	59	2	72
66	2	78	60	2	74
67	3	81	61	1	75
68	2	83	62	2	76
70	1	84	63	2	78
71	1	85	64	1	79
72	2	87	65	1	80
73	4	91	66	2	82
75	1	92	67	4	86
76	1	93	68	3	89
77	1	94	69	2	91
78	1	95	72	1	92
79	1	96	74	1	93
81	2	98	78	1	94
82	1	99	79	1	95
85	1	100	80	1	96
			81	1	97
			88	1	98
			90	2	100

TABLE 24

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM THIRTEEN TO FOURTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
11	1	1	13	1	1
20	3	4	14	1	2
23	1	5	20	1	3
25	2	8	21	2	5
28	1	9	22	1	7
29	1	10	25	1	8
30	1	11	26	1	9
31	3	14	27	3	12
32	2	16	31	2	14
33	1	18	32	1	15
39	2	20	36	1	16
41	1	21	38	1	18
43	2	23	39	1	19
46	2	25	40	1	20
47	3	29	43	1	21
49	1	30	44	3	24
50	1	31	45	2	26
51	2	33	46	3	30
52	1	34	47	1	31
53	3	37	48	1	32
54	2	40	49	2	34
56	5	45	51	1	35
57	1	46	52	2	37
58	2	48	53	1	38
59	4	53	54	2	41
60	4	57	55	1	42

TABLE 24--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
61	2	59	56	3	45
62	3	63	57	1	46
64	1	64	58	1	47
65	3	67	59	4	52
66	2	69	60	2	54
67	1	70	61	1	55
68	2	73	62	5	60
70	2	75	63	2	63
71	2	77	64	2	65
72	1	78	65	1	66
74	3	81	67	1	67
75	4	86	68	1	68
76	2	88	70	3	71
77	1	89	71	1	73
79	2	91	72	2	75
80	1	92	73	4	79
81	1	93	74	1	80
82	1	95	75	2	82
83	2	97	76	2	85
84	1	98	77	1	86
89	1	99	78	2	88
96	1	100	79	1	89
			80	2	91
			81	1	92
			83	1	93
			85	1	95
			86	2	97
			90	2	99
			93	1	100

TABLE 25

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM FOURTEEN TO FIFTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
7	1	1	9	1	1
15	1	2	12	2	3
16	1	3	16	1	3
20	1	3	19	1	4
21	2	5	24	1	5
29	3	8	25	1	6
31	1	8	29	1	7
32	1	9	30	2	8
34	1	10	33	2	10
36	4	13	34	2	12
37	2	15	36	1	13
38	2	17	37	1	13
39	1	18	38	1	14
41	1	18	39	2	16
42	1	19	40	1	17
43	3	22	41	3	19
44	2	23	42	2	21
46	3	26	43	2	23
47	3	28	44	2	24
48	2	30	45	2	26
49	1	31	46	2	28
50	2	33	47	1	28
51	2	34	48	3	31
52	3	37	49	1	32
53	1	38	50	1	33
54	3	40	51	2	34
55	3	43	52	2	36
56	1	43	53	2	38

TABLE 25--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
57	3	46	54	4	41
58	2	48	55	3	43
59	2	49	56	3	46
60	2	51	57	2	48
61	4	54	58	5	52
63	1	55	59	3	54
64	1	56	60	1	55
65	5	60	61	2	57
66	2	62	62	2	58
67	2	63	63	2	60
68	2	65	64	2	62
69	1	66	65	2	63
70	4	69	66	3	66
71	1	70	68	5	70
72	5	74	69	1	71
73	1	75	70	3	73
74	2	77	71	1	74
75	2	78	73	6	79
77	2	80	75	1	80
78	3	83	76	1	81
79	4	86	77	2	83
81	2	88	78	3	85
82	2	89	79	3	88
84	2	91	80	1	88
85	1	92	81	1	89
87	2	93	83	4	93
88	2	95	89	2	94
89	3	98	90	2	96
92	1	98	91	1	97
93	1	99	94	1	98
95	1	100	95	1	98
			97	1	99
			98	1	100

TABLE 26

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM FIFTEEN TO SIXTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
17	2	1	18	1	1
18	1	2	25	2	2
19	1	2	30	2	3
20	1	3	31	2	4
22	2	4	32	1	4
23	1	4	33	1	5
27	1	5	34	1	6
29	1	6	35	2	7
30	1	6	37	1	7
31	1	7	38	2	8
33	2	8	39	1	9
34	1	8	41	3	10
35	1	9	42	3	12
37	2	10	43	1	13
38	1	10	44	6	16
39	2	12	45	2	17
40	1	12	48	3	19
41	2	13	49	2	20
42	4	15	50	4	22
43	1	16	52	1	23
44	1	17	53	3	24
46	1	17	55	1	25
47	3	19	56	3	27
48	4	21	57	2	28
49	1	22	58	3	29
50	4	24	59	5	32
51	2	25	60	1	33
52	2	26	61	6	36

TABLE 26--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
53	2	27	62	3	38
54	3	29	63	3	39
55	3	30	64	5	42
56	1	31	65	3	44
57	3	33	66	2	45
58	2	34	67	5	48
59	1	34	69	8	52
60	8	39	70	5	55
61	2	40	71	4	57
62	3	41	72	3	59
64	2	43	73	2	60
65	4	45	74	4	62
66	4	47	75	3	64
67	3	49	76	3	65
68	5	51	77	3	67
69	4	54	78	6	70
70	4	56	79	2	71
71	2	57	80	7	75
72	5	60	81	5	78
73	4	62	82	4	80
74	2	63	83	2	81
75	5	66	85	3	83
76	5	69	86	2	84
77	8	73	87	5	87
78	2	74	88	4	89
79	3	76	89	2	90
80	4	78	90	1	91
81	1	78	91	4	93
82	5	81	92	2	94
83	2	82	93	5	97
84	2	83	94	3	98

TABLE 26--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
85	3	85	95	2	99
86	4	87	97	1	100
87	1	88			
88	3	90			
89	6	93			
90	1	93			
91	3	95			
92	2	96			
93	1	97			
94	2	98			
96	2	99			
97	2	100			

TABLE 27

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM SIXTEEN TO SEVENTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
5	1	1	10	1	1
17	1	1	19	1	1
18	1	2	20	1	2
25	1	3	21	1	3
30	3	5	26	3	5
33	1	6	34	1	6
35	1	6	35	2	7
36	1	7	41	1	8
41	1	8	42	1	8
43	1	8	43	1	9
44	1	9	44	2	10
45	1	10	46	1	11
46	2	11	47	2	13
47	2	13	49	2	14
50	1	13	50	2	15
51	3	15	51	3	17
52	1	16	52	1	18
53	1	17	53	1	19
55	2	18	55	1	20
57	3	20	57	3	22
58	1	21	58	3	24
59	2	22	59	4	27
60	1	23	60	1	27
61	1	24	61	3	29
62	2	25	62	2	31
63	2	27	63	1	31
64	5	30	64	2	33
65	3	32	66	4	36

TABLE 27--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
66	4	35	67	2	37
67	5	38	68	4	40
68	1	39	69	4	43
69	2	41	70	2	44
70	5	44	71	2	45
71	1	45	72	3	48
72	5	48	73	5	51
73	3	50	75	4	54
74	3	52	76	1	55
75	3	55	77	6	59
76	3	57	78	2	60
77	1	57	79	5	64
78	4	60	80	3	66
79	1	61	81	1	66
80	5	64	82	4	69
81	5	68	83	3	71
82	2	69	84	2	73
83	1	70	85	4	76
84	6	74	86	2	77
85	5	78	87	6	81
86	3	80	88	3	83
87	2	81	89	4	86
88	3	83	90	5	90
89	2	85	91	2	91
90	3	87	92	1	92
91	3	89	93	3	94
92	4	92	94	1	94
93	2	93	95	1	95
94	1	94	96	3	97
95	3	96	97	1	98
96	2	97	98	1	99
97	2	99	99	1	99
98	1	99	100	1	100
99	1	100			

TABLE 28

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM SEVENTEEN TO EIGHTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
40	2	3	32	1	2
47	1	5	42	1	3
51	1	6	44	1	5
52	1	8	46	1	6
56	1	9	51	2	9
57	1	11	53	1	11
59	1	12	61	1	12
60	1	14	62	1	14
64	3	18	64	2	17
66	1	20	65	1	18
67	1	22	68	5	26
69	1	23	69	1	28
71	1	25	70	1	29
72	3	29	71	1	31
73	2	32	73	3	35
75	4	38	74	2	38
76	2	42	76	1	40
77	1	43	77	1	42
78	4	49	78	1	43
79	2	52	79	3	48
80	2	55	80	2	51
81	2	58	81	2	54
82	1	60	82	4	60
83	5	68	83	3	65
84	1	69	84	1	66
85	2	72	85	3	71
87	2	75	86	3	75

TABLE 28--Continued

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
88	3	80	87	2	78
89	4	86	88	2	82
90	2	89	89	1	83
92	1	91	90	2	86
93	2	94	91	1	88
94	1	95	92	1	89
95	1	97	93	1	91
96	1	98	94	3	95
97	1	100	95	2	98
			98	1	100

3

TABLE 29

A COMPARISON OF RAW SCORES AND PERCENTILE RANKS ON FORMS A AND B FOR STUDENTS FROM EIGHTEEN TO NINTEEN YEARS OF AGE

Form A			Form B		
Score	Frequency	Percentile	Score	Frequency	Percentile
44	1	5	52	1	5
45	1	10	53	1	10
52	2	20	54	2	20
59	1	25	56	1	25
62	1	30	58	1	30
65	1	35	60	1	35
66	2	45	61	1	40
68	2	55	65	1	45
70	2	65	66	1	50
72	1	70	68	1	55
73	1	75	70	1	60
74	2	85	71	1	65
78	1	90	74	1	70
82	1	95	75	2	80
94	1	100	77	2	90
			85	1	95
			86	1	100

APPENDIX G

ITEM ANALYSIS SHOWING PER CENT (P) OF SUBJECTS PASSING ORIGINAL AND REORDERED FORMS OF TEST

TABLE 30

ITEM ANALYSIS DATA SHOWING PER CENT (P) OF 771 SUBJECTS PASSING EACH FLASH CARD ON FORM A OF THE ORIGINAL TEST BASED ON 120 HOURS OF PRETESTING

Flash Card	P	Flash Card	P	Flash Card	P	Flash Card	P
1	99	26	77	51	51	76	83
2	92	27	82	52	36	77	61
3	95	28	85	53	59	78	75
4	91	29	82	54	53	79	22
5	90	30	84	55	60	80	29
6	96	31	78	56	77	81	27
7	91	32	79	57	73	82	25
8	92	33	79	58	84	83	30
9	96	34	78	59	48	84	29
10	87	35	78	60	52	85	27
11	87	36	72	61	56	86	30
12	94	37	75	62	52	87	28
13	85	38	55	63	44	88	34
14	89	39	63	64	47	89	26
15	83	40	86	65	50	90	22
16	78	41	81	66	52	91	37
17	85	42	78	67	55	92	37
18	83	43	35	68	54	93	17
19	81	44	70	69	47	94	18
20	80	45	52	70	50	95	28
21	85	46	89	71	49	96	19
22	85	47	68	72	60	97	21
23	86	48	85	73	68	98	22
24	88	49	84	74	70	99	11
25	81	50	62	75	69	100	8

TABLE 31

ITEM ANALYSIS DATA SHOWING PER CENT (P) OF 81 SUBJECTS PASSING EACH FLASH CARD ON FORM A OF THE FIRST REORDERING OF THE TEST BASED ON RESULTS FROM 771 SUBJECTS

Flash Card	P	Flash Card	P	Flash Card	P	Flash Card	P
1	100	26	85	51	58	76	75
2	99	27	89	52	72	77	67
3	96	28	93	53	78	78	57
4	95	29	89	54	74	79	51
5	94	30	80	55	69	80	58
6	99	31	77	56	72	81	44
7	94	32	91	57	70	82	54
8	94	33	85	58	70	83	57
9	91	34	83	59	74	84	60
10	86	35	79	60	67	85	53
11	94	36	73	61	69	86	59
12	88	37	85	62	75	87	42
13	89	38	79	63	67	88	52
14	90	39	90	64	73	89	47
15	89	40	69	65	69	90	51
16	89	41	75	66	70	91	46
17	83	42	75	67	68	92	43
18	85	43	80	68	62	93	43
19	93	44	89	69	63	94	22
20	94	45	85	70	65	95	33
21	86	46	81	71	64	96	40
22	85	47	77	72	64	97	28
23	85	48	75	73	51	98	25
24	80	49	72	74	51	99	5
25	75	50	70	75	63	100	1

TABLE 32

ITEM ANALYSIS DATA SHOWING PER CENT (P) OF 137 SUBJECTS PASSING EACH FLASH CARD ON FORM A OF THE SECOND REORDERING OF THE TEST BASED ON RESULTS FROM 81 SUBJECTS

Flash Card	P	Flash Card	P	Flash Card	P	Flash Card	P
1	100	26	86	51	63	76	36
2	99	27	84	52	62	77	36
3	99	28	73	53	57	78	39
4	98	29	73	54	72	79	34
5	98	30	85	55	63	80	34
6	96	31	74	56	57	81	32
7	92	32	63	57	57	82	31
8	96	33	74	58	55	83	31
9	96	34	86	59	58	84	34
10	96	35	68	60	55	85	31
11	95	36	70	61	50	86	30
12	92	37	86	62	60	87	29
13	95	38	73	63	58	88	28
14	84	39	82	64	52	89	28
15	95	40	62	65	62	90	28
16	86	41	67	66	48	91	28
17	90	42	79	67	50	92	26
18	92	43	67	68	44	93	28
19	92	44	77	69	55	94	23
20	99	45	64	70	47	95	18
21	86	46	63	71	50	96	18
22	86	47	58	72	45	97	14
23	86	48	62	73	45	98	12
24	85	49	59	74	41	99	3
25	86	50	59	75	38	100	1

APPENDIX H

ANALYSIS OF FLASH CARDS BY TYPE OF ERROR MOST FREQUENTLY MADE: FORM A

TABLE 33

AN ANALYSIS OF FLASH CARDS BY TYPE ERROR MOST FREQUENTLY MADE: FORM A

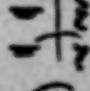
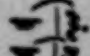
Type Error	Time Signature	Time Unit	Flash Card No.	Total Errors	Areas	Comparison of Flash Cards By Number	Total Subjects Repeating Errors	Per Cent Repeating Errors	Comments Regarding Unusual Distribution
𝅝	C	♩	25	26		. .	. .	. .	Alla breve time seems to make card 40 more difficult.
𝅝	¢	♩	40	55		. .	. .	. .	
𝅝‿♩	5/4	♩	38	104		38-53	34	32.6	Uncommon time signature.
	5/4	♩	53	80	I	38-68	24	23.0	
	5/4	♩	68	66		53-68	32	40.0	
♩‿𝅝	5/4	♩	39	89		. .	. .	. .	Unusual rhythm
	6/4	♩	43	118		43-69	16	13.5	
	6/4	♩	69	97					
▬	4/4	♩	3	14		. .	. .	. .	Less familiar time signature
	6/4	♩	71	81		. .	. .	. .	
▬	3/4	♩	30	49		30-31	20	40.8	In eaah case, error fell on second measure of problem. On card 34, the rhythm wasfollowed by a 𝅗𝅥., thus increasing the difficulty of the rhythmical problem.
	3/4	♩	31	41	II	30-32	17	34.6	
	3/4	♩	32	32		31-32	17	41.4	
	3/4	♩	34	40					
▬	2/4	♩	4	38		4-10	13	34.2	
	2/4	♩	10	33	III	4-13	15	39.4	
	2/4	♩	13	27		10-13	15	45.4	
	3/4	♩	35	58		. .	. .	. .	An identical problem in a different time signature.
	2/4	♩	64	224		. .	. .	. .	
	4/4	♩	98	204		. .	. .	. .	
	2/4	♩	65	203		. .	. .	. .	
	2/4	♩	100	225		. .	. .	. .	
♩	4/4	♩	1	11		. .	. .	. .	
	4/4	♩	2	22		. .	. .	. .	Error follows ▬
	4/4	♩	9	8		. .	. .	. .	
	4/4	♩	17	23		. .	. .	. .	Error followed by 𝅗𝅥

TABLE 33--Continued

Type Error	Time Signature	Time Unit	Flash Card No.	Total Errors	Areas	Comparison of Flash Cards By Number	Total Subjects Repeating Errors	Per Cent Repeating Errors	Comments Regarding Unusual Distribution
𝅗𝅥	3/4	♩	22	45	IV	22-23	6	13.3	Syncopated effect
	3/4	♩	23	31		22-24	5	11.1	Syncopation
	3/4	♩	24	28		23-24	5	16.1	Syncopation
	3/4	♩	28	28					Error is preceded by 𝅗𝅥.
𝅗𝅥 𝅗𝅥‿♪	3/2	𝅗𝅥	44	105		. .	. .	. .	Unusual time signature
	4/4	♩	85	294		. .	. .	. .	Syncopation
	4/4	♩	86	250		. .	. .	. .	Syncopation
	5/8	♪	91	145		. .	. .	. .	𝅗𝅥. rhythm
𝄼	C	♩	15	47		. .	. .	. .	
	4/4	♩	19	34		. .	. .	. .	
	6/4	♩	70	81		. .	. .	. .	Preceded by ♩‿𝅗𝅥
𝄻	3/4	♩	16	56	V	16-29	13	23.2	
	3/4	♩	29	43		16-33	5	8.9	
	3/4	♩	33	42		29-33	6	13.9	
	¢	𝅗𝅥	41	40		. .	. .	. .	In each case the 𝄼 was preceded by o and followed by 𝅗𝅥
	¢	𝅗𝅥	42	55		. .	. .	. .	
𝄻‿|𝄽	5/4	♩	37	64		. .	. .	. .	
♩	2/4	♩	6	9		. .	. .	. .	No rests
	2/4	♩	11	33		. .	. .	. .	♩ followed by 𝄽
	2/4	♩	12	9		. .	. .	. .	No rests
♩	4/4	♩	21	21		. .	. .	. .	Syncopation
	3/4	♩	48	48		. .	. .	. .	Syncopation following rest
	3/8	♪	73	53		. .	. .	. .	Unusual time signature
	3/8	♪	74	97		. .	. .	. .	Follow ♩.
𝄽	2/4	♩	5	28		. .	. .	. .	
	4/4	♩	18	47		. .	. .	. .	Syncopation
	3/2	𝅗𝅥	45	137		. .	. .	. .	Less familiar time sig.
	6/8	♪	87	182		. .	. .	. .	

TABLE 33--Continued

Type Error	Time Signature	Time Unit	Flash Card No.	Total Errors	Areas	Comparison of Flash Cards By Number	Total Subjects Repeating Errors	Per Cent Repeating Errors	Comments Regarding Unusual Distribution
𝄽	3/4	♩	7	39		7-8	4	13.3	
	3/4	♩	8	30					
	3/8	♪	55	149		55-75	49	32.8	
	3/8	♪	75	118		. .	. .	. .	
♩.	2/4	♩	51	180		. .	. .	. .	
	2/4	♩	59	199		. .	. .	. .	Syncopation
	2/4	♩	60	167		. .	. .	. .	Syncopation
	2/4	♩	61	123		. .	. .	. .	Syncopation
♩.	3/8	♪	54	138		. .	. .	. .	
	3/8	♪	72	81		. .	. .	. .	
	3/8	♪	92	159					Less familiar time signature
♩.	6/8	♩.	56	84		. .	. .	. .	
♩.	12/8	♩.	79	234		79-80	106	45.2	
	12/8	♩.	80	152		. .	. .	. .	
♩.‿♩	9/8	♪	94	279		. .	. .	. .	
𝄽.	2/4	♩	52	247		. .	. .	. .	Syncopation
	6/8	♩.	57	90		. .	. .	. .	
♪	3/4	♩	46	43		46-49	10	23.2	
	3/4	♩	49	37		. .	. .	. .	
♪	2/4	♩	62	179		62-66	88	49.1	Syncopation preceded by one ♩
	2/4	♩	66	141		. .	. .	. .	Syncopation preceded by ♩ and 𝄼
	2/4	♩	67	157		. .	. .	. .	Syncopation preceded by ♩ ♩ ♩
♪	3/8	♪	76	60		. .	. .	. .	
	3/8	♪	78	91		. .	. .	. .	Unusual rhythmical pattern
	9/8	♩.	88	230		. .	. .	. .	Syncopation preceding and following
	6/8	♪	84	124		. .	. .	. .	
	4/4	♩	97	154		. .	. .	. .	Syncopation

TABLE 33--Continued

Type Error	Time Signature	Time Unit	Flash Card No.	Total Errors	Areas	Comparison of Flash Cards By Number	Total Subjects Repeating Errors	Per Cent Repeating Errors	Comments Regarding Unusual Distribution
𝄾	3/4	♩	47	128		. .	. .	. .	
	3/4	♩	50	178		. .	. .	. .	Syncopation
	2/4	♩	63	268		. .	. .	. .	Syncopation
	9/8	♪	83	311		. .	. .	. .	
𝅗𝅥.	C	♩	14	29		. .	. .	. .	Syncopation
	C	♩	27	31		. .	. .	. .	
	4/4	♩	20	31		. .	. .	. .	
	5/4	♩	36	51		. .	. .	. .	Less familiar time sig.
	6/8	♩.	58	66		. .	. .	. .	
𝅗𝅥.‿♩	9/4	♩	95	229		. .	. .	. .	
𝅗𝅥.‿♪	4/4	♩	81	159		. .	. .	. .	Synoopation followed by rest
	4/4	♩	82	217		. .	. .	. .	Syncopation followed by note
	9/8	♪	93	323		. .	. .	. .	
	9/8	♪	96	226		. .	. .	. .	
𝄼.	C	♩	26	51		. .	. .	. .	
	3/8		77	148		. .	. .	. .	
	2/4		99	350		. .	. .	. .	Syncopation
♪	3/4		89	218		. .	. .	. .	
	3/4		90	216		. .	. .	. .	

APPENDIX I

TABULAR PRESENTATION OF PER CENT (P) OF SUBJECTS SCORING AT EACH EXPERIENCE LEVEL WITHIN A GIVEN RANGE OF FLASH CARDS AND RECOMMENDATIONS FOR SCORING

TABLE 34

PER CENT (P) OF SUBJECTS SCORING AT EACH EXPERIENCE LEVEL WITHIN A GIVEN RANGE OF FLASH CARDS AND RECOMMENDATIONS FOR SCORING

Experience in Years	Flash Card Numbers	P	Flash Card Numbers	P	Flash Card Numbers	P	Flash Card Numbers	P	Flash Card Numbers	P
0-1	0-4	1.05	5-20	16.84	21-52	69.49	53-68	9.47	69-84	3.16
1-2	10-14	0.76	15-32	16.79	33-69	63.36	70-87	18.32	88-100	0.76
2-3	15-28	1.87	29-42	15.89	43-68	63.55	69-82	18.69	83-95	0.00
3-4	20-39	3.20	40-51	12.00	52-76	68.80	77-89	15.20	90-100	0.80
4-5	25-43	3.88	44-56	12.62	57-82	66.02	83-93	16.50	94-100	0.97
5-6	30-50	2.86	51-61	10.00	62-83	71.42	84-94	11.42	95-100	4.28
6-7	35-61	1.92	62-71	15.38	72-90	67.31	91-95	11.53	96-100	3.85
7-8	40-63	3.70	64-74	9.26	75-92	64.81	93-96	14.81	97-100	7.40
8-9	45-73	2.94	74-79	11.76	80-93	70.59	94-99	14.71	100	--
Recommended Scoring	Low		Below Average		Average		Above Average		High	

BIBLIOGRAPHY

Allen, R., Butterfield, W., and Tully, M. *Providence Inventory Test in Music*. New York: World Book Co., 1932.

Andrews, Francis N. "Issues and Problems in Music Education," *Music Educators Journal*, XLIX (September-October, 1962), 40.

Beach, F. A. *Beach Musical Accomplishment Test*. Emporia, Kansas: Bureau of Educational Measurements and Standards, Kansas State Teachers College, 1930.

Bean, K. L. "An Experimental Approach to the Reading of Music," *Psychological Monographs*, L (1938), 1-80.

Buros, O. K. (ed.). *The Fourth Mental Measurements Yearbook*. New Jersey: The Gryphon Press, 1953, p. 341.

Buros, O. K. (ed.). *The Nineteen Forty Mental Measurements Yearbook*. New Jersey: The Gryphon Press, 1941, pp. 154-5.

Buros, O. K. (ed.). *The Nineteen Thirty-Eight Mental Measurements Yearbook*. Rutgers University Press, 1938, pp. 119-20.

Dykema, Peter W., and Cundiff, H. M. *New School Music Handbook*. Evanston, Ill.: Summy-Birchard Co., 1939.

Dykema, Peter W., and Gehrkens, Karl W. *The Teaching and Administration of High School Music*. Evanston, Ill.: Summy-Birchard Co., 1941.

Gehrkens, K. W. *Music in the Grade Schools*. Evanston, Ill.: Summy-Birchard Co., 1934.

Gildersleeve, G. *Gildersleeve Music Achievement Test*. New York: Bureau of Publications, Teachers College, Columbia University, 1933.

Gordon, E. B. "Why Johnny Can't Read," *Music Educators Journal*, XLIV (January, 1958), 36.

Hutchinson, H. E., and Pressey, L. W. *The Hutchinson Music Tests*. Bloomington: Public School Publishing Co., 1924.

Knuth, W. E. Knuth Achievement Test in Music. Princeton, N. J.: Educational Test Service, 1936.

Kotick, M. L., and Torgerson, T. L. Diagnostic Tests of Achievement in Music. Monterey, Calif.: California Test Bureau, 1950.

Kwalwasser, J. "Tests and Measurements in Music," Psychological Bulletin, XXV (May, 1928), 299-301.

Kwalwasser, J. "Tests and Measurements in Music," Psychological Monographs, XL (1930), 33-37.

Kwalwasser, J., and Ruch, G. M. Kwalwasser-Ruch Test of Musical Accomplishment. Iowa City: State University of Iowa Extension Division, 1924.

Lamp, C. J., and Keys, N. "Can Aptitude for Specific Musical Instruments be Predicted," Journal of Educational Psychology, XXVI (November, 1935), 581-96.

Madison, Thurber H. "An Adventure in Concepts," Music Educators Journal, XLIV (January, 1958), 32.

Monroe, W. S. (ed.). Encyclopedia of Educational Research. New York: Macmillan Company, 1950, p. 768.

Murphy, Howard A. Teaching Musicianship. New York: Coleman-Ross Co., Inc., 1950.

Mursell, J. L. Education for Musical Growth. Boston: Ginn and Co., 1948.

Mursell, J. L., and Glen, M. The Psychology of School Music Teaching. New York: Silver-Burdett and Co., 1931.

Revelli, William D. "What About Rhythm?" Etude, LXXIII (May, 1955), 56.

Schillinger, Joseph. The Schillinger System of Musical Composition. New York: Carl Fisher, Inc., 1946.

Watkins, J. G. Objective Measurement of Instrumental Performance. New York: Bureau of Publications, Teachers College, Columbia University, 1942.

Wheelwright, L. F. An Experimental Study of Perceptibility and Spacing of Musical Symbols. New York: Bureau of Publications, Columbia University, Teachers College, 1939.